

AUTOMOTIVE INDUSTRIES

AUTOMOBILE

Reg. U. S. Pat. Off.
Established 1902

Vol. 62

No. 18

NORMAN G. SHIDLE, Directing Editor
LESLIE PEAT, Managing Editor
P. M. HELDT, Engineering Editor
JOSEPH GESCHELIN, Asso. Eng. Editor
ATHEL F. DENHAM, Field Editor
HAROLD E. HILLMANN, Asst. Editor
HERBERT HOSKING, News Editor
HAROLD M. BAKER, Detroit News Rep.
A. B. CROFOOT, N. Y. News Rep.

Contents

Growth of World Rubber Consumption. By Harry Symington	679
Why the V-Type Sixteen-Cylinder Engine? By Athel F. Denham	685
Building the Franklin Airplane-Type Automobile Engine. By Joseph Geschelin	686
Just Among Ourselves	690
Driver's Financial Responsibility Laws Enhance Safety. By Leslie Peat	691
Power Losses in Transmissions Measured by Direct Tests	692
Rolls Royce Develops Aluminum Alloy Termed "Hiduminium"	697
Focke-Wulfe Hawk Has Modified Taube Wing	699
New Developments	700
Automotive Oddities	704
News of the Industry	705
Financial Notes	706
Men of the Industry	710
Calendar of Events	714
Advertisers' Index	114, 115

Automotive Industries is published every Saturday by
CHILTON CLASS JOURNAL COMPANY

Chestnut and 56th Streets, Philadelphia, Pa.

C. A. MUSSELMAN, President and General Manager
J. S. HILDRETH, Vice-Pres. and Director of Sales
W. I. RALPH, Vice-Pres. G. C. BUZBY, Vice-Pres.
A. H. VAUX, Secretary and Treasurer
JOHN A. CLEMENTS, Asst. Treasurer

JULIAN CHASE, Business Manager
Automotive Industries

GEO. D. ROBERTS
Advertising Manager

Cable Address Autoland, Philadelphia
Telephone Sherwood 1424

OFFICES

New York—U. P. C. Bldg., 239 W. 39th St., Phone Pennsylvania 0080
Chicago—5 South Wabash Ave., Phone Central 7045
Detroit—710 Stephenson Bldg., Phone Northway 2090
Cleveland—1140 Guardian Bldg., Phone Main 6860
Los Angeles—433 Petroleum Securities Bldg., Phone Westmore 9084

Controlled by United Business Publishers, Inc., 239 West 39th St., New York;
ANDREW C. PEARSON, Chairman, Board of Directors; FRITZ J. FRANK, President;
C. A. MUSSELMAN, Vice-President; F. C. STEVENS, Treasurer.

SUBSCRIPTION RATES: United States, Mexico, United States Possessions,
Canada and all countries in Postal Union, \$3.00 per year; Foreign, \$6.00 per year.
Single Copies 35c.

COPYRIGHT, 1930, CHILTON CLASS JOURNAL COMPANY

Member of the Audit Bureau of Circulations
Member Associated Business Papers, Inc.

Automotive Industries—The Automobile is a consolidation of the Automobile
(monthly) and the Motor Review (weekly), May, 1902; Dealer and Repairman
(monthly), October, 1903; the Automobile Magazine (monthly), July, 1907, and the
Horseless Age (weekly), founded in 1895, May, 1918.

WYMAN- GORDON AVIATION FORGINGS

CRANK-
SHAFTS

MASTER
RODS

LINKRODS

CAMSHAFTS

CAMRINGS

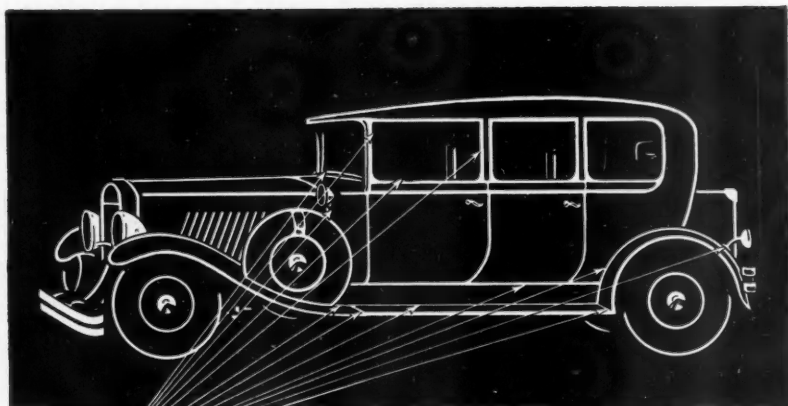
PROPELLOR
HUBS

REDUCTION
GEARS

ADDRESS the
AVIATION
DIVISION
AT WORCESTER

IN THE AIR
TO-DAY
AS ON THE
HIGHWAYS
FOR
30 YEARS

WYMAN- GORDON WORCESTER MASS. HARVEY ILL.



You can SILENCE *those* BODY JOINTS

*with ARMSTRONG'S GLAZING STRIP
... the weatherproof Cushion ...*

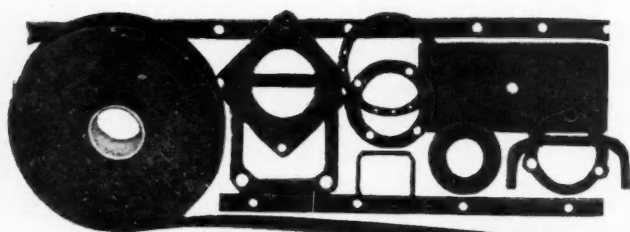
THE same qualities which have made Armstrong's Glazing Strip the perfect cushion between glass and its channel have brought new uses for this material. Among these is its use as a silencing gasket between metal-to-metal body joints. Fender parking lamps, tire carrier brackets, instrument boards, the joints between running boards, fenders, splash aprons and the like can all be cushioned with Armstrong's Glazing Strip.

Elusive rattles and squeaks between body joints of metal are permanently silenced. Two thirds cork by volume, this resilient strip always expands after compression—it never "sets."

The binder used with the cork makes Armstrong's Glazing Strip weatherproof and waterproof. It will not disintegrate or glaze.

Faced on one or both sides with a fabric liner, Armstrong's Glazing Strip is a material of high tensile strength—a fit material for body gaskets. It is available in three thicknesses— $\frac{1}{32}$, $\frac{1}{16}$ and $\frac{3}{32}$ inches.

We will furnish gaskets cut to your drawing and requiring no extra finishing. Or you can buy rolls of any width not exceeding 34 inches. Write the Armstrong Cork Company, 928 Arch Street, Lancaster, Pennsylvania, for further information, samples and prices.



Armstrong's
(A)
Product

Many large manufacturers are using Armstrong's Cork Gaskets. They never stretch or shrink. The bolt holes always line up . . . Another widely used product is Armstrong's AutoMat, a running board covering. Write for samples and prices.

Armstrong's Glazing Strip

FOR PERMANENT WEATHERPROOF CUSHIONING

Increase in quantity of rubber in American tires of noteworthy assistance in maintaining the normal



Growth of World Rubber Consumption

By Harry Symington

Symington and Sinclair
London

OUR review for last year opened with the statement that 1928 had been the most difficult and trying time the rubber market had ever experienced. We think most of those connected with the market will agree that 1929 has shown little if any improvement on 1928. In the early part of the year the outlook seemed to be improving. The heavy accumulations in Malaya and Ceylon were being absorbed and world consumption was increasing rapidly. The consumption in the month of May in the United States amounted to 49,233 tons, constituting a new high record for any single month and showing an average daily consumption of 1894 tons.

Up to the end of July stocks in the United Kingdom had increased only about 14,500 tons from the low record at the end of November, 1928, thus showing that the bulk of the heavy shipments were being absorbed by consuming countries.

The second half of the year saw a rapid change in the general outlook. Malayan shipments instead of falling off as one might reasonably have expected after accumulations had been shipped away commenced to rise steadily, resulting in shipments averaging 38,000 tons a month, which exceeded original estimates by about 8000 tons monthly. During the second half of the year American consumption also dwindled, showing a steady decrease month by month, the declared con-

sumption for the second half of the year amounting to only 200,600 tons compared with 269,300 tons for the first six months. December consumption was declared at only 23,531 tons, being at the rate of 941 tons per working day and also being the lowest recorded consumption for any month since July, 1924. In the last five months of the year United Kingdom stocks increased by 38,500 tons, an average rate of 7700 tons per month. The Hatry affair in London and the collapse of the stock markets in New York both helped the depression in the latter part of the year.

In our last review we set out various estimates of production and consumption and gave what appeared to us at the time to be reasonable grounds for these estimates. We anticipated total shipments for the year of about 726,000 tons, of which 350,000 tons were to be shipped from Malaya. The world's total shipments for 1929 have worked out at 862,500 tons, of which 449,000 tons have come from Malaya.

We have before us a table showing the average of the estimates of production issued by 10 statistical

STOCK IN UNITED KINGDOM

at end of each Month in Tons of 2240 lbs.

Rubber Trade Association of London

	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929
January	23,514	62,279	76,539	82,144	63,561	29,899	11,055	56,983	68,609	28,919
February	22,096	65,792	76,337	78,253	62,579	25,636	10,930	61,092	65,259	29,619
March	23,346	70,918	75,332	70,439	61,335	19,891	14,408	65,562	60,360	32,489
April	24,394	76,318	77,142	65,217	60,440	14,164	20,353	69,720	55,858	35,897
May	23,820	78,833	79,148	60,615	56,643	6,534	21,807	70,045	46,815	35,753
June	25,070	78,465	80,658	56,826	55,985	5,707	25,344	66,822	41,057	35,501
July	27,744	80,702	80,412	55,649	56,684	4,561	29,238	66,709	37,787	34,672
August	33,180	82,844	80,259	53,961	54,218	4,948	31,683	67,772	34,337	43,059
September	38,731	82,077	79,124	60,408	47,994	6,078	36,815	71,441	33,642	52,121
October	45,583	79,373	76,763	64,886	40,868	5,750	43,933	72,525	26,584	61,616
November	49,790	81,091	76,757	66,297	36,630	4,531	45,969	69,844	19,960	70,026
December	55,672	79,661	81,081	66,563	32,376	6,250	51,243	66,208	22,565	73,174

"authorities" in January and February, 1929. The average of those estimates is 716,250 tons.

Fortunately for the market estimates of consumption proved to be equally wrong and the error was in the same direction, that is to say, consumption was badly under-estimated. The error lies chiefly in a heavy under-estimate for countries outside the United States. We put the United States at 460,000 tons and we calculate that actual consumption turned out to be 480,000 tons, which is slightly higher than the declared consumption. A very large development has taken place in countries outside the United States. According to our calculations the consumption for these countries worked out at a total of 317,000 tons for 1929 against 242,500 tons for 1928. Consumption in these countries exceeds our estimate by 54,000 tons and shows a 30½ per cent advance on 1928.

The United States consumption for 1929 works out at 60¼ per cent of the world's total consumption. This compares with 64¾ per cent in 1928, 64 per cent for 1927, 67¼ per cent for 1926 and an average of 70 per cent for the years 1919 to 1925.

The increased consumption in countries other than the United States follows on the increased "motorization" of these countries and the consequent increased consumption of tires on this side. Because of the protective duties existing on the Continent the larger American car and tire manufacturers have established works there and owing to the safeguarding duties imposed in Great Britain the same thing has happened here. The American branch factories are responsible for part of the increase, but naturally the already existing European and British factories have very much increased their turnover.

According to the monthly figures published by the Rubber Manufacturers' Association, consumption in the United States for 1929 amounted to 469,905 tons.

Deducting the declared consumption from the net imports the figure of increase in stock should be 58,697 tons, so that about 20,000 tons have disappeared somewhere.

Stock should have risen about 7500 tons and has actually increased by 15,500 tons. In view of all the above considerations we think it is probably fair to allot half of the discrepancy to undeclared consumption and regard the other half as undeclared stock. On

this basis we have put American consumption in our table at 480,000 tons.

In our last year's review we mentioned that invisible supplies inside the United Kingdom factories were probably at a lower point Dec. 31, 1928, than at any previous time for several years. This was owing to the abolition of restriction Nov. 1 which caused manufacturers to use up existing stocks and not replenish at once, relying on large arrivals in December to bring the market back to a more attractive level for their purchases. Calculating from imports, exports and increase in stocks deliveries to the United Kingdom for the year 1929 would appear to have amounted to 72,065 tons. We think we may assume that manufacturers are now carrying at least one month's more supply in their factories than they were a year ago, and estimating this at about 5500 tons we put the United Kingdom consumption down at 66,500 tons.

Canadian imports for the year may be taken to approximately represent consumption. These amount to 36,500 tons against 31,000 tons in 1928 and 26,500 tons in 1927.

French imports for 11 months totaled 63,651 tons, so that the total for the year will be at least 68,000 tons. We understand, however, that these figures are gross and that they include Gutta Percha. Allowing for both of these items and also for some increase in stocks in manufacturers' hands we have put French consumption at 60,000 tons, which is an increase of 50 per cent over last year.

Germany imported about 50,000 tons but there have



been some additions to stock and fairly heavy shipments to Russia. We have put German consumption down at 45,000 tons.

No import and export figures are available for Russia, but we understand that the Soviet Government put their consumption for the financial year ending Sept. 30, 1929, at about 17,500 tons.

Japan is becoming a serious competitor in all rubber manufactures and is finding a ready market for her products in Eastern countries and in Australia.

We calculate that the visible supply at the end of each of the past three years has been as follows:

	1927	1928	1929
Singapore	21,750	22,500	28,000
Penang	4,050	10,500	5,200
United Kingdom	66,200	22,500	73,200
U. S. A.—			
Manufacturers	80,900	51,000	63,000
Dealers	19,200	15,000	42,000
Continent	3,500	4,500	6,400
Afloat	67,000	117,500	90,400
Total	262,600	243,500	308,200

In making this calculation we have only included figures from points where the stocks are more or less officially known and where they have been known for the past two years.

It will be seen that according to the above figures supplies show an increase on the year of 64,700 tons while our estimates show that we calculate that shipments from producing countries exceeded consumption by 65,500 tons.

The British Ministry of Transport statement showing licenses current Nov. 30 each year for the past three years, gives the following figures:

	1927	1928	1929
Private Cars (taxed on hp.)....	739,310	821,481	898,586
Hackneys (including buses and charabancs)	78,283	77,996	80,589
Goods Vehicles	281,272	301,121	324,805
Motorcycles	518,867	516,306	516,053
Total	1,617,732	1,716,904	1,820,033

The increase or decrease in each class (except motorcycles which show little variation) each year over the preceding year is as follows:

Motor Vehicles (Including Motorcycles)						
	1927		1928		1929	
Private	+ 96,460	= 13.0%	+ 82,171	= 11.1%	+ 77,105	= 9.4%
Hacks	- 4,394	= 5.3%	- 287	= 0.4%	- 2,593	= 3.4%
Commercial ..	+ 23,989	= 9.4%	+ 19,849	= 7.1%	+ 23,684	= 7.9%

It is interesting to note that after two years of

WORLD RUBBER CONSUMPTION

(In tons of 2240 lb.)	1928	1929	1930
United States	441,500	480,000	505,000
Canada	31,000	36,500	40,000
United Kingdom	48,500	66,500	70,000
Germany, etc.	43,000	45,000	46,000
France	40,000	60,000	70,000
Italy	12,000	15,500	16,000
Russia	14,500	17,500	19,000
Scandinavia	3,500	5,500	6,000
Belgium and Holland	9,500	11,000	14,000
Australia	9,000	15,500	20,000
Japan	25,000	35,000	40,000
Other Countries	6,500	9,000	10,000
Total	684,000	797,000	856,000

* Estimated.

gradual decline the number of hackney vehicles registered is again on the up grade. We attribute the fall in numbers in 1927 and 1928 to a gradual change brought about by the introduction of more buses and charabancs and a less frequent use of small vehicles like taxis. The increased use of charabancs for long distance journeys is very marked, and will probably become even more so as time goes on.

Another interesting feature is the very steady growth in commercial vehicles. The size of these vehicles is on the increase and more pneumatic tires are being used on them.

The import and export figures both of motor vehicles and tires continue to show a favorable balance in the trade of the United Kingdom. The detailed figures for the past three years are as follows:

Motor Vehicles (Including Motorcycles)			
	1927	1928	1929
Exports	£14,068,114	£13,447,217	£15,308,233
(including re-exports)			
Imports	£8,223,036	£7,599,637	£9,274,485
Balance	£5,845,078	£5,847,580	£6,033,748
Tires (Including Tubes and Solid Tires)			
Exports	£4,282,647	£3,610,639	£4,296,281
(including re-exports)			
Imports	£3,124,942	£ 972,648	£ 615,974
Balance	£1,157,705	£2,637,991	£3,680,307

In our previous reviews we have dealt with the output of cars and trucks in the United States and Canada as a unit. For the purpose of a rubber review we have decided that it is better to separate the figures, as the tires for Canadian-built and assembled cars are mostly made in Canada.

Our estimate for the minimum probable output of cars in the United States during 1930 works out as follows:

Replacements	3,750,000
New Buyers	750,000
Export	500,000
Total	5,000,000

In view of the steady increase year by year which has continued up to now we do not think an estimate of 750,000 for new buyers is really adequate but prefer to be on the safe side. This would actually mean an increase of only 3 per cent in 1930 over 1929, which is low compared with the percentage increases quoted above.

An important factor regarding the American tire trade is the steady in-





crease in the quantity of rubber going into each tire. The quarterly *Questionnaire* of the Rubber Association of America gives the quantity of rubber used in the

manufacture of tires and the quantity used in the manufacture of tubes per quarter. From these figures we have made the following calculations:

	Amount of Rubber per Tire	Amount of Rubber per Tube	Total per Tire & Tube
1928			
1st Quarter	8.09 lb.	1.74 lb.	9.83 lb.
2nd "	7.72 "	1.64 "	9.36 "
3rd "	8.45 "	1.69 "	10.14 "
4th "	9.63 "	1.78 "	11.41 "
1929			
1st Quarter	9.48 lb.	1.85 lb.	11.33 lb.
2nd "	9.31 "	1.86 "	11.17 "
3rd "	9.89 "	1.92 "	11.81 "

A preliminary estimate by the United States Department of Commerce puts the average for the complete year at 10 lb. per tire and 2 lb. per tube.

The additional weight of rubber per tire and tube is we believe in the main accounted for by the increased use of the so-called giant tire on buses and trucks, and the larger tires used on the new Ford car. To some extent, however, there is no doubt that the increase is due to the production of a better tire. Some of the American manufacturers are now producing a super tire designed to give much greater mileage than former productions. The turning out of a better tire by putting more rubber into it is all to the good from one point of view but greatly increased mileage of course means fewer replacements. This factor has already made itself felt in 1929.

The falling off in United States tire and tube production was the more remarkable in view of

the record year for car production. New equipment for 5,350,000 cars at four tires per car would require 21,400,000 tires. Exports amounted in round figures to 2,600,000 tires. These two items together account for 24,000,000 tires out of total deliveries of 74,000,000 tires, leaving only 50,000,000 for replacements, which divided over 24,750,000 cars, the number running at the beginning of 1928, gives an average replacement of only 2.02 tires per car.

The average rate of replacement for the seven years, 1922 to 1928, works out at 2½ tires per car. Many authorities, including large American tire manufacturers, are looking for a much higher rate of replacement in 1930 owing to the low replacement rate of 1929. For our calculations we have preferred to estimate that 1930 replacements will run at only slightly over the rate ruling in 1929. We have calculated on 2.1 tires per car for 1930.

Our estimate for tire output in the United States for 1930 works out as follows:

5,000,000 new cars at four tires each.....	20,000,000 tires
Replacements for 26,400,000 cars at 2.1 tires per car	55,440,000 "
Exports	2,100,000 "
Total	77,540,000 "

Taking a figure of 11.9 lb. of rubber per tire and tube and supposing no more tubes to be manufactured than tires, we find that this output would require a total of 411,500 tons of rubber. To this fails to be added at least 16,500 tons of rubber used by the tire trade for solid and cushion tires, cycle and airplane tires, repair materials and various sundries. These figures give a minimum requirement for the tire trade in the United States alone of 428,000 tons. The proportion of rubber used by the tire trade to total rubber consumption in the United States keeps steady at approximately 85 per cent, so that if the tire trade in 1930 uses 428,000 tons the total consumption for the country would work out at approximately 505,000 tons. We think this estimate may prove to be on the low side for two reasons. Firstly, the new car business may very easily exceed 5,000,000 units and, secondly, replacements may be much heavier than we have allowed for. A great deal will depend on general prosperity not only in America but in the rest of the world.

The low price for raw rubber ruling throughout 1929 has not brought about any appreciable reduction in the amount of reclaimed rubber used in America. Apparently the preparation of this material has been improved to such an extent that it is now a much more serious competitor with raw rubber than formerly.

RUBBER SHIPMENTS

(Tons of 2,240 lb.)

	1928	1929	1930
Malaya	297,500	449,000	425,000
Ceylon	56,000	80,500	75,000
British India	11,000	12,000	12,000
British Borneo	6,700	6,500	7,000
Sarawak	11,300	11,000	11,500
Dutch East Indies	226,000	259,000	270,000
Indo-China	9,000	9,800	10,500
Other Plantations	7,000	8,000	9,000
Brazil	24,500	22,500	22,000
Wild	4,500	4,200	4,000
Total	653,500	862,500	846,000

From the quarterly *Questionnaire* figures published by the Rubber Association of America, we have extracted the consumption of crude rubber and the consumption of reclaimed, and have worked out the ratios for 1928 and 1929. These work out as follows:

	Raw Rubber	Reclaimed	Ratio Reclaimed to Crude	
1928	tons	tons	tons	
1st Quarter	103,558	54,685	52.83%	Average 48.68%
2nd "	103,500	52,837	51.05%	
3rd "	117,573	55,127	46.91%	
4th "	117,597	51,641	43.95%	
1929				
1st Quarter	128,565	60,121	46.76%	Average 48.14%
2nd "	139,292	62,297	44.72%	
3rd "	113,746	56,963	50.08%	
4th "	85,990	45,645	53.78%	

The higher ratio in the second half of 1929 is probably due to fewer tires being manufactured at that season compared with the first half of the year.

Average Malayan shipments for the last six months of that year were 38,000 tons a month. This was followed by shipments for January officially estimated at 43,000 tons of Malayan produced rubber.

According to the figures of the Washington Department of Commerce the total planted area in Malaya at the end of 1924, which may be taken as being the maximum in bearing in 1930, was 2,369,000 acres. The report of the cooperative selling committee of the Rubber Growers' Association issued in November last put the European and American owned acreage Dec. 31, 1927, at 1,300,000 acres and the Asiatic owned acreage also at 1,300,000 acres, giving a total of 2,600,000 acres, which may be said to confirm the Department of Commerce figure for three years earlier.

Referring to the 1929 output from Malaya we have shown that a figure averaging about 420 lb. per acre was obtained in that year from European estates and 540 lb. per acre from native small holdings. There is a consensus of opinion that during 1928 and 1929 the small holders heavily over-tapped their trees so that they will not have sufficient bark to maintain the same output in 1930. For 1930 we are therefore calculating on a reduction to 520 lb. per acre for small holdings. We have no figure of output from Asiatic owned estates, but have adopted for this calculation a mean of 460 lb. per acre.

For the purpose of calculation, we have taken a total of 2,300,000 acres as being in full bearing in 1930.

This calculation gives a potential output from

U. S. NET IMPORTS OF RUBBER

(Tons of 2,240 lb.)

(United States Department of Commerce Returns)

	1927	1928	1929
January	41,814	37,120	53,922
February	25,886	30,926	61,331
March	32,752	36,970	46,391
April	44,628	35,685	52,437
May	33,736	28,658	48,350
June	31,270	25,044	38,677
July	35,719	28,171	40,914
August	31,001	28,497	35,207
September	29,801	36,694	32,803
October	27,671	41,653	35,840
November	36,123	33,836	40,972
December	28,082	40,781	40,588
Total	398,483	404,035	527,432

End year adjustments by Dept. of Commerce give totals of { 407,753 528,602



Malaya of 472,000 tons for 1930 but for the reasons given below we do not think that actual shipments will reach this figure.

Though price is of course the chief factor, weather also has an important influence on output. The year 1929 was an exceptionally favorable one from the weather point of view. Every estate manager expects tapping to be stopped for a certain number of days each year owing to heavy rainfall, when tapping is impossible, as the latex is washed out of the cups. We understand that in 1929 the number of non-tappable days was well below the average. A repetition of this state of things is hardly to be expected this year.

So far as estates are concerned a proposal is at present before the growers to cease tapping altogether for the month of May. Based on last year's figures we estimate that this means a reduction of 33½ lb. per planted acre, which on 1,500,000 estate acres, European and Asiatic, would mean a reduction of 22,500 tons in output, or supposing 80 per cent of the acreage came into the scheme would mean about 18,000 tons. We have included Asiatic owned acreage as we understand there is a probability of a considerable portion of the Asiatic acreage being brought voluntarily into the scheme.

In any event we do not think that the price will be sufficiently favorable to produce the full output of 286,600 tons from the estates this year.

Any really substantial and lasting rise in price would inevitably lead to heavier tapping and bigger outputs all around.

With 446,000 acres planted at the end of 1923 Ceylon has shipped in 1929 80,500 tons of her own produce.

During the period of restriction Ceylon had fairly liberal assessments, so much so that Ceylon shipments during restriction were frequently below her exportable quota. For this reason and because shipments in November and December, 1928, were heavy, it is not likely that Ceylon had much in the way of old accumulations to ship during 1929. We have estimated her shipments of newly produced rubber for the year at 78,000 tons, which, on the acreage above mentioned, works out at approximately $5\frac{3}{4}$ acres per ton. New planting in Ceylon during 1924 totaled only 15,000 acres, giving a total of 461,000 acres as the probable area in bearing this year. This indicates a potential yield of 80,000 tons. The estates in Ceylon will probably adhere to the plan to cease tapping in May and price may affect output from the small holdings to some extent. We have, therefore, estimated for an output of only 75,000 tons from Ceylon in 1930.

We showed in connection with the 1929 output of the Dutch East Indies that shipments for the last seven months of the year showed a less rapid rate of increase than during the first five months. It is probable that in the Dutch East Indies the effect of over-tapping two years ago is now making itself felt in the native areas and in certain districts the price is doubtless having some effect. There are large areas waiting for a better price to come into production.

Potential Dutch Production

Assuming that 70 per cent of the estate area agrees to the Anglo-Dutch plan to cease tapping altogether in May, this would involve a reduction of about 9000 to 10,000 tons, reducing probable estate output to 155,000 tons.

It is generally accepted that natives tap their areas considerably earlier than European owned estates, so that when calculating native output one must advance the date by one year. Owing to over-tapping in the past some of the older areas will probably be poor yielders and price will be an important factor. We think if we allow for a 12 per cent increase in Dutch native rubber in 1930, that should be sufficient. This would indicate a production of about 115,000 tons.

Two separate investigations have been made on the spot, one by the Dutch East Indies Department of Agriculture and another by representatives of the Rubber Growers' Association. The reports resulting from these investigations give estimates of the potential production of native rubber in the Dutch East Indies for 1930, which work out very closely, the Dutch Department of Agriculture estimating 135,000 tons and the Rubber Growers' Association 138,500 tons. The important difference is that the Department of Agriculture thinks that 1/- per lb. in Europe would be a high enough price to bring out the whole of this potential production while the Rubber Growers' Association report puts the price at $1\frac{1}{6}$ per lb.

Our estimate, assuming no big rise in price during the year, works out as follows:

Estate production 155,000 tons
Native production 115,000 tons

Total 270,000 tons

Price will probably prevent any marked increase in output particularly in India where for the most part the yield per acre is low and the cost relatively high. We have estimated for no increase from India and a moderate increase from other sources except Brazil and "Wild" which we have reduced slightly. We summarize our estimates for 1930 as follows:

	1929	1930
Malaya	449,000 tons	425,000 tons
Ceylon	80,500 "	75,000 "
Dutch East Indies....	259,000 "	270,000 "
Other Sources	74,000 "	76,000 "
Total	862,500 "	846,000 "

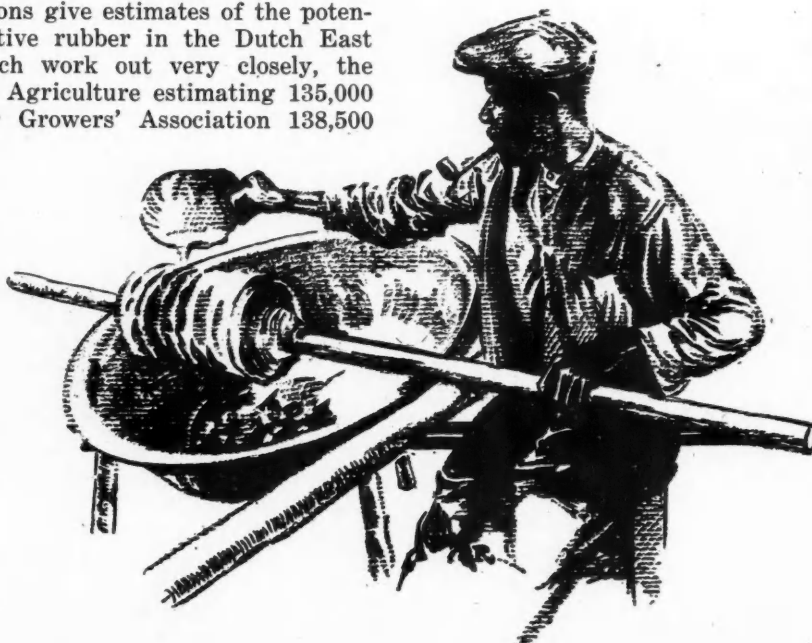
The new areas coming steadily into bearing together with improved methods of cultivation and tapping seem to present sufficient guarantee against a world shortage of rubber for many years to come. The remedy which seems to be most urgently called for just now is a world-wide prohibition of new planting though we fear there would be great difficulty in making such a prohibition effective. So long as prices remain below 1/- however, no extensive planting is likely to be undertaken.

France, Australia and Japan are progressing rapidly, and we have allowed for further large increases in their consumption. Taken together we have put countries outside the United States at a total of 351,000 tons this year against 317,500 tons for 1929. This represents an increase of about $10\frac{3}{4}$ per cent for these countries against $30\frac{1}{2}$ per cent last year. Our estimates therefore work out as follows:

	1929 tons	1930 tons	Increase tons
U. S. A.	480,000	505,000	25,000 = 5%
Other Countries	317,000	351,000	34,000 = $10\frac{3}{4}$ %
Total	797,000	856,000	59,000 = $7\frac{1}{2}$ %
Ratio of U. S. to total..	$60\frac{1}{4}$ %	59%	

In our paragraph dealing with the tire trade in the United States, we arrive at an estimate of American consumption for 1930 of 505,000 tons. This would represent an increase of 25,000 tons, or about 5 per cent over the high record of 1929.

Canada will continue to increase. We have allowed for an addition of 10 per cent this year, bringing Canadian consumption up to 40,000 tons.



Why the V-Type Sixteen Cylinder Engine?

Adoption of design made it possible for the Cadillac Motor Car Co. to take advantage of power increase without change in chassis units.

By ATHEL F. DENHAM

JUST why the Cadillac Motor Car Co. adopted a 16-cylinder engine for its latest addition, and why it adopted the particular design presented in the Cadillac V-16, formed the topic of an address to the Detroit Section, Society of Automotive Engineers, by W. R. Strickland, assistant chief engineer of Cadillac.

"In projecting a car that would have the desired performance characteristics we considered necessary for the utmost in passenger cars," Mr. Strickland stated, "we realized that it would be necessary, considering a weight of around 5000 to 6000 lb. to be essential, that power would have to be increased around 35 to 40 per cent. This made it practically imperative to adopt a larger number of cylinders." In explanation, Mr. Strickland said that it was practically impossible at present to obtain such an increase in power through thermodynamic improvement, increase in compression ratio or change in combustion chamber design. Larger cylinders, meaning larger bores, largely due to design limitations, were also objectionable for several reasons, chief among which are the poorer heat conditions, the piston head heat increasing as the cube of the bore, while the heat dissipating area of ring contact increased only directly as the bore.

Chassis Subject to Less Fatigue

Moreover, the adoption of a 16-cylinder Vee-type engine, according to Mr. Strickland, who showed a number of curves on slides to illustrate his point, made it possible to take advantage of the possible power increase without any changes in inherent design of chassis units. Mr. Strickland's curves showed that the effect of the larger number of cylinders was to decrease the stress variations, without increasing the peak stresses. As a result, chassis driving units are claimed to be less subject to fatigue than even in the eight-cylinder Cadillac, and the same basic design and sizes could be used.

The adoption of a 45-deg. angle between the blocks was dictated by clearance limitations under the hood, Mr. Strickland showing outline sketches of how a 60-deg. Vee would interfere with steering gear mounting, etc. The small Vee of course immediately called for overhead valves since there would not be sufficient room in the Vee for L-head valve design.



W. R. Strickland, assistant chief engineer, Cadillac Motor Car Co., who addressed the S.A.E. in Detroit

The use of overhead valves of course would have made it possible to use even smaller angles for the Vee, but these offered more complicated manifolding problems.

Mr. Strickland further described the various special features of the V-16 engine used by Cadillac, which information was published in *Automotive Industries* last January. Regarding the bugaboo of heavy oil consumption, commonly associated with multi-cylinder engines, Mr. Strickland said that this is overcome by proper ring design and accuracy of manufacture. One of the author's charts also indicated that the fuel consumption curve for the V-16 was quite flat up to around 2800 r.p.m., and in the neighborhood of .6 lb. per hp. per hr. Maximum horsepower as indicated on the same diagram, but claimed by Mr. Strickland to be conservative, was 165 at 3200.

Projection Welding Needs Standard

Preceding the dinner meeting, H. M. Woofter, chief engineer, C. E. Swift, Electric Welding Co., presented a paper on welding in general, and resistance welding in particular. Mr. Woofter stated that a two-phase welder, for better power factor, is now under development for such applications as axle housing.

Mr. Woofter also deplored the lack of definite knowledge regarding the possibilities and limitations of projection welding. As a result, each welding application has to be developed by special research. Mr. Woofter claimed that no formulae published to date on applications of projection welding have any value as they apply only to highly specialized cases and individual welders.

Building the Franklin Airplane-Type

PARALLELING the recent advances in air-cooled aviation engine design, the 1930 Franklin automobile engine embodies features which make possible the development of more horsepower per cubic inch displacement than in any previous model. And, very naturally, the production man's interest centers

Cylinder head is an individual casting of British "Y" metal, an aluminum alloy, with integrally cast and special bronze inserts.

alloy, with integrally cast air-cooling fins. The final step in this development is the recent introduction of the permanent-mold method of casting, which produces virtually a die-cast part with beautifully smooth fins having a finish comparable to that of machined fins. Porosity, the bugaboo in all molding work, particularly in aluminum alloys, has been reduced almost to the vanishing point, thereby eliminating one of the most serious obstacles in the building of an engine of this type. For, although it may not be widely known, they have demonstrated time and again that porosity contributes materially to compression losses and decreased engine efficiency. In their present lineup both the cylinder head and cylinder barrel are water-tested under pressure in the rough and in the finished state, as a routine check on this very condition.

The use of an aluminum alloy cylinder head entails

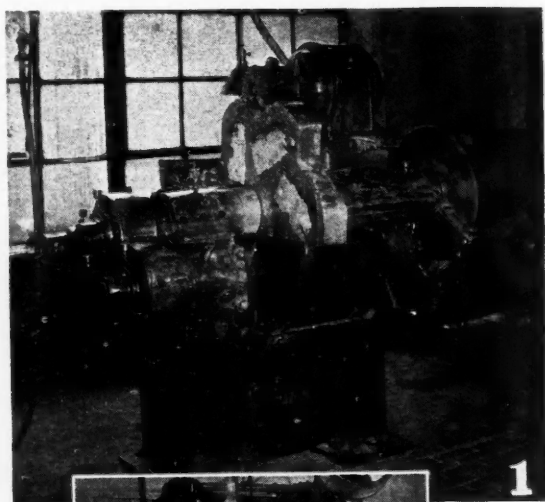


Fig. 1—Ingersoll four-spindle drum-type miller
Rough and finish mill top and bottom surfaces of cylinder head
Production 75 pieces per hour

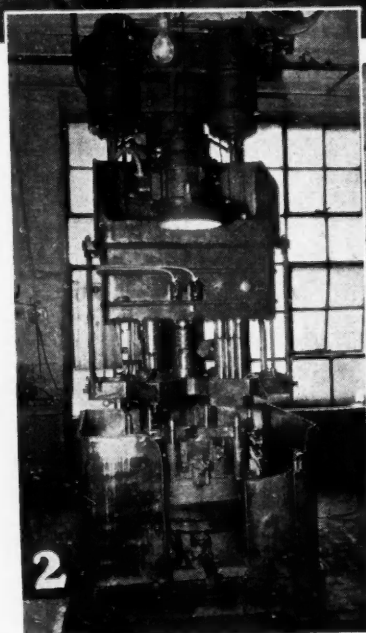


Fig. 2—C-16-H Nateo hydraulic multiple drill
Rough and finish contour of dome, bore tenon and drill stud holes of cylinder head
Production 60 pieces per hour

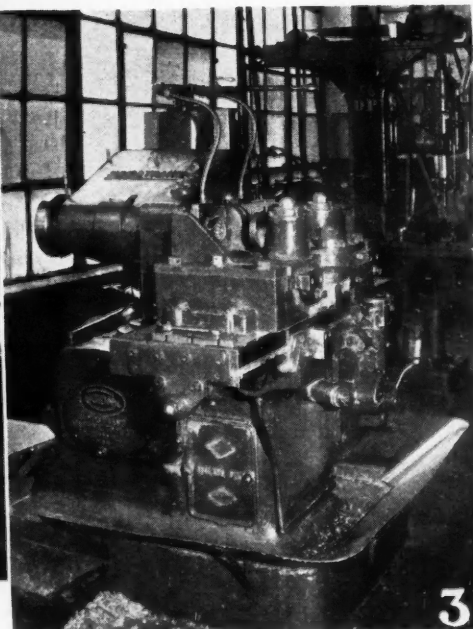


Fig. 3—No. 30 Sundstrand Hydraulic Rigidmil with special two-spindle head
Mill relief in dome under valves
Production 60 pieces per hour

Fig. 4—Special fixture for assembling valve inserts
Production 30 pieces per hour per fixture



about the methods employed in producing this engine on a quantity basis.

Unquestionably the key element of this new engine is the new cylinder head, which diverges radically from their previous practice and contributes largely to the increased compression ratio and the unusually quiet overhead valve mechanism. The cylinder head is an individual casting of British "Y" metal, an aluminum

Automobile Engine

By JOSEPH GESCHELIN

the introduction of bronze ring inserts for the intake and exhaust valves and a threaded insert for the spark plugs. The valve inserts are pressed in with a shrink fit and then permanently locked by spinning the adjacent aluminum section over the insert. Originally, the spark plug insert was scheduled to be a shrink fit, but later it was found more satisfactory to assemble by hand, using an extra leverage on the socket wrench

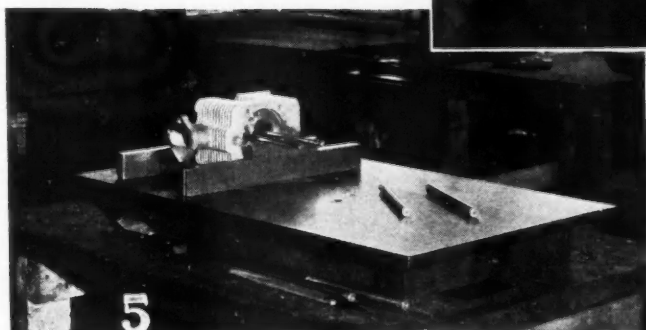
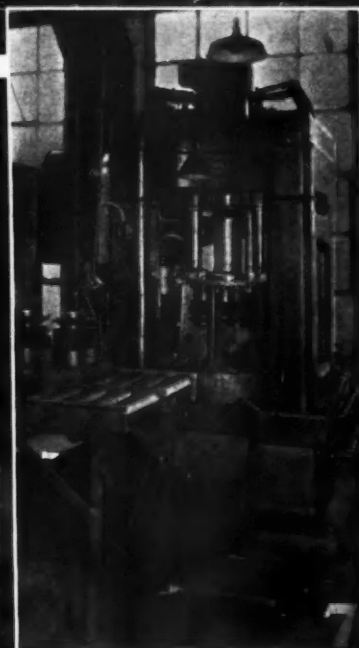
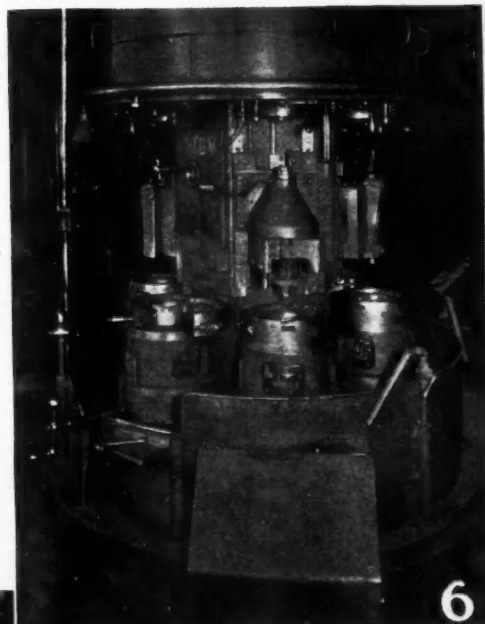


Fig. 8—V-4 Newton vertical continuous miller
Rough and finish mill bottom and top surfaces of crankcase
Production 14 pieces per hour

Fig. 7—Franklin special cylinder boring machine
Semi-finish bore for pistons
Production 60 pieces per hour

Fig. 6—Bullard 12-in. six-spindle Mult-au-Matic
Finish face bottom flange, chamber cylinder bore and drill four stud holes in cylinder barrel
Production 60 pieces per hour

Fig. 5—Method of checking parallelism of valve guide holes



and then to pin in place. Numerous tests have shown that after the cylinder head is heated for some time under operating conditions, these inserts become virtually an integral part of the casting and cannot be removed without machining them out.

The cylinder barrel is of cast iron as heretofore, extreme care being taken to relieve all strain after machining operations. For example, the initial machining operations include two rough bores, after which the cylinder barrel is normalized in an annealing fur-

nace to remove all machining strains and age the structure. Before the cylinder barrel is completed it undergoes two additional boring cuts and the honing operation. An unusually interesting detail is the finishing of the joint face at the top, which, instead of being exactly at right angles to the vertical axis of the cylinder, is turned accurately 21 minutes from the perpendicular. This is said to produce a better gasketed joint between the cylinder head and the barrel, at the same time relieving the strain due to tightening up at assembly. Two new Monarch lathes were rebuilt to handle this operation, the effect being obtained by offsetting both head and tail stocks with respect to the ways, while the tool rest was left in its original alignment.

Being based on a moderate program, initial planning for the machine shop layout presents an interesting study in production economics. The new engine demanded a realignment of their machine shop facilities entailing the introduction of a number of new ma-

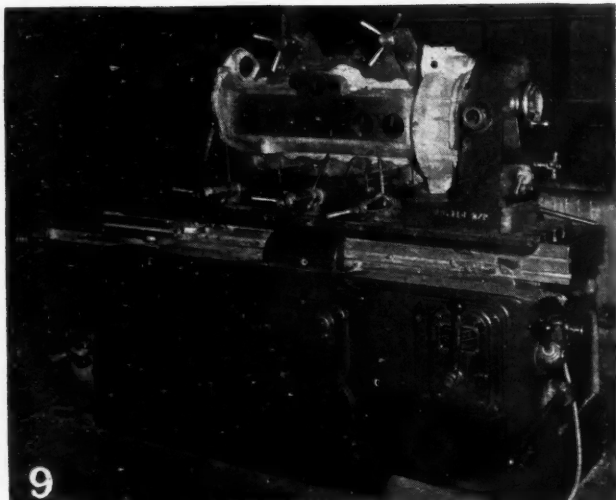


Fig. 9—No. 3-38 Cincinnati plain hydraulic miller
Face miller seats for crankcase bearing caps
Production 12 pieces per hour

chines. Logically enough, most of this equipment had to be universal in nature, or at least to possess universality to a large degree. In this respect the machine shop layout differs from those planned for mass production. Yet it boasts a four-way drilling machine with a set-up of 82 spindles on a crankcase operation which rivals many a setup in other automotive plants. Another interesting machine is a W. & J. Barnes horizontal boring machine with a circular indexing fixture which permits the setup of two crankcases at one time. This machine has only one driving head but it can be readily converted into a double end machine if desired.

A really unusual feature, although familiar to those who have gone through the Franklin plant, is the variety of machines designed and built in their plant. Chief of these are: a radial tapping machine, a special machine for finish boring crankcase bearings and two massively constructed automatic cylinder-boring machines. Some of these machines have given 10 years of continuous service.

The interested observer will immediately sense the absence of the usual roller conveyor connecting inter-machine operations. This is explained by the fact that a single operator watches a number of machines necessarily scattered because of the configuration of the floor plan. Roller conveyors were in use at one time, but had to be taken out because they hampered the movement of machine operators. This is both reasonable and logical, considering the moderate productive capacity of each machine and the obvious difficulties in their case of grouping the machines tended by one man.

Machine shop operations on the crankcase hold unusual interest because it is a unit trough made of aluminum and with light sections throughout. Accordingly it demands careful handling and requires auxiliary supporting structures on a number of machines. Proper fitting of the bearing studs is accomplished in a simple manner here by tapping each stud hole individually with a ground tap on a single spindle tapping machine with extended bed and sliding fixture.

Following current practice, the cylinder head dome is completely machined and formed to produce a special undercut contour. Since in their case it would not be economical to buy a single-purpose machine for this operation, they process the job on two standard machines. The dome is initially formed to a spherical shape by means of a solid forming cutter in a setup on a hydraulic multiple drilling machine. Then in a subsequent operation the undercut is formed on a milling machine by reciprocating the head horizontally against special forming cutters.

To gain a good perspective of the machine shop layout we can take the following brief excursion along the production line and single out some of the operations. The first unit is the cylinder head which is completely finished here from the rough. In preparation for the milling operation on the top and bottom faces, the flanges are ground on a Besly double-end disk grinder. Fig. 1 shows a new Ingersoll drum-type continuous milling machine with fixtures designed for milling the top and bottom faces of the cylinder head. The casting now is tested and passes along to the Natco hydraulic drill press (Fig. 2) where the following operations are automatically performed: finish tenon diameter, drill tap holes in the bottom and rough and finish the contour of the dome. The head then undergoes several other operations, among which are the drilling, reaming and tapping of the spark plug insert hole. Then the relief in the dome of the cylinder head is formed on the Sundstrand Rigidmil (Fig. 3) in two set-ups, semi-finish and finish. In this department, interest naturally centers about the insert operations. As mentioned above, the spark plug insert, although designed for a shrink fit, is screwed in by hand. The heads then proceed through an electric furnace (Fig. 4) where they are heated to a temperature of 550 deg. Fahr. and as they emerge, they are picked up by the operator, who presses in the valve

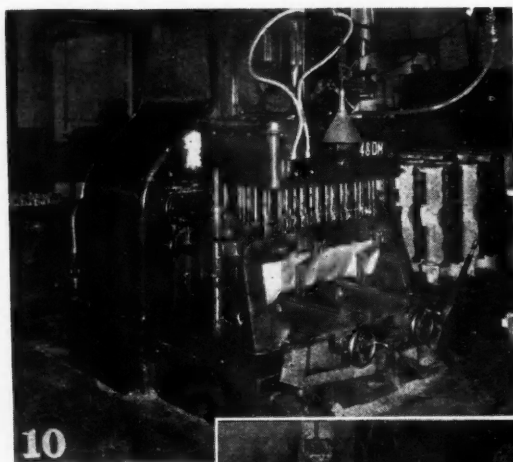


Fig. 10—Footburt two-way multiple drill
Drill bottom and right-hand side of crankcase
Production 30 pieces per hour

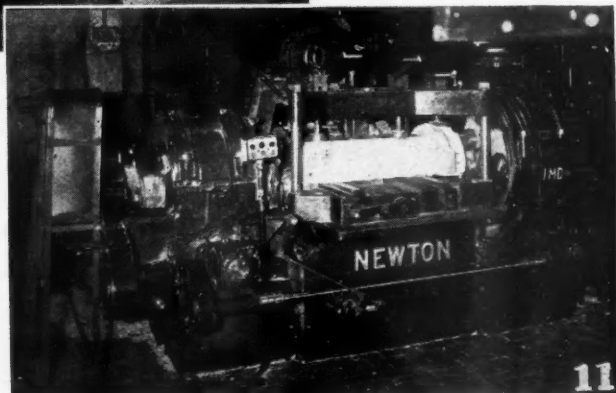


Fig. 11—Type "C" Newton duplex planetary and sliding head miller
Mill front and rear ends and generator and starter seats
Production 17 pieces per hour

inserts on the fixture shown to the left of the furnace. Immediately following this, the inserts are spun in place. Then a number of other details are completed, including a refinishing of the valve insert and retapping the spark plug holes, inasmuch as the dimensions of these parts are found to be somewhat altered after they are permanently in place. The severity of their inspection is well illustrated in Fig. 5, which shows a check for parallelism of the valve guide holes. The alignment of the two 12-in. arbors is not permitted to vary more than the thickness, (0.005 in.) of the feeler, which is inserted at one end.

Initial operations on the cylinder barrel take place in the basement in order to accommodate a large normalizing furnace, whose function is to age the casting and relieve it of the initial casting and machining strains. The preparatory operation of rough-facing the hold-down flanges and drilling screw holes in the flanges is performed on a Bullard Multa-Matic (Fig. 6) provided with a special drilling station, actuated by the revolving work. The cylinder is then rough bored in two cuts on a special four-spindle machine (Fig. 7) which was designed and built in their own shop. After normalizing, the cylinder is given two semi-finish boring cuts, a water test and finally the flanges are faced and finished. As mentioned earlier they have two 16 x 6 Monarch lathes set up to finish-turn the joint face on the head end, at an angle of 21 minutes to the normal right-angle line with the vertical axis of the cylinder. For this purpose they found it necessary to change the alignment of the head and tail stocks. In the final operation the cylinder is reamed to 3.498-4.499 in.; and then individually honed and inspected.

The crankcase line comprising 35 operations from the raw stock inspection to the final inspection, presents a variety of interesting operations and ingenious adaptations of practically universal machines. An interesting kink that might well be borrowed from the

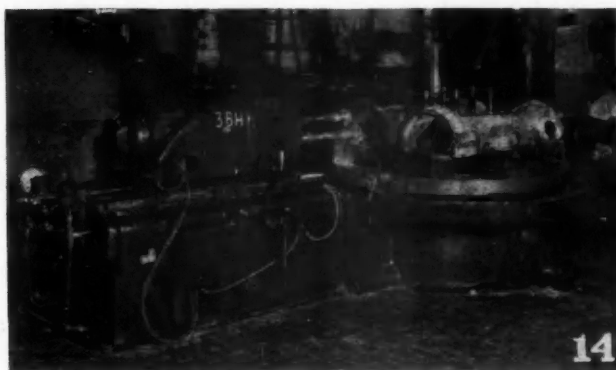


Fig. 14—W. F. & J. Barnes rotary table horizontal boring machine
Rough and semi-finish bore crankshaft hole and rough and finish bore camshaft hole
Production 16 pieces per hour

crankcase line is found in connection with the engine enamel with which the interior of the casting is sprayed for sealing. This enamel is a home-made preparation consisting of odds and ends from their paint shop and looks like a mighty good contribution to the cause of waste elimination.

The top and bottom faces are completely rough and finish-milled on the Newton rotary table continuous milling machine, shown in Fig. 8. Crankshaft bearing seat faces are rough and finish-milled on a Cincinnati Hydromatic milling machine (Fig. 9). The two-way Footburt drilling machine (Fig. 10) drills 77 holes including two stud holes 3 in. deep. The drilling of these long holes appears to be compatible with the production rate of the machine, although on a high-production job it is often the practice to shift this operation to a smaller machine. Fig. 11 shows an interesting operation on a Type C Newton duplex milling machine. The generator pad structure is relatively light and unsupported, necessitating light cuts and even under favorable conditions it was found advisable to support the overhanging portion by a special strap attached to the fixture.

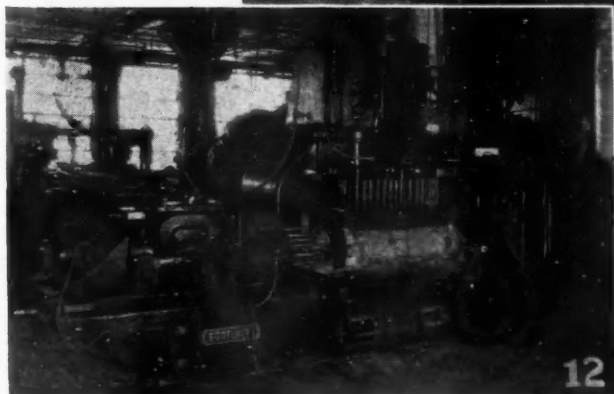
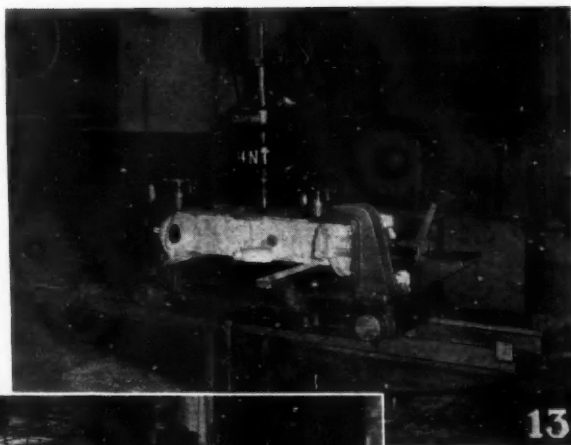
Four additional milling operations precede the operations of the four-way Footburt drilling machine (Fig. 12) which drills 82 holes, two of them being 2¾ in. deep. Here again is a setup which would probably be altered on a mass production job, by shifting the two deep holes to a smaller machine. Another interesting piece of equipment in this lineup is a special drilling machine which they made themselves for drilling odd holes on the starter and generator pads, reaming the starter shaft bushings and spot-facing two other holes. Forty-four holes are tapped on the Footburt multi-spindle tapping machine while all remaining holes are tapped on an adjoining Hammond radial tapper. To insure an accurate fit for the main bearing studs, the 12 stud holes are tapped individually on a special Garvin tapper using a ground tap (Fig. 13). This method has given excellent results, comparable with a hand-tapping operation while the one machine keeps up with the production line with facility.

Camshaft and crankshaft bearing bores are bored

(Continued on page 696)

Fig. 13—No. 2-X Special Garvin tapper with special fixture
Tap crankshaft bearing cap stud holes
Production 10 pieces per hour

Fig. 12 — Footburt four-way multiple drill
Drill top front and rear and left-hand side of crankcase
Production 30 pieces per hour



Just Among Ourselves

No Change in Trend Away From "Companion Car" Idea

A YEAR or two ago we made bold to show that the companion car idea never had worked out very well from a merchandising standpoint. Either the companion car itself didn't go over big, or it went so well that the original car to which it had been attached began to show signs of slumping.

We sought for and discussed possible reasons for the sameness of experiences in this regard.

Nothing has happened since that time to point a change in trend. In fact, another companion car, the Roosevelt, has since been absorbed under the name of its mother line, and, before the type in which these words have been set is remelted, another companion car will have merged quietly its identity with the family name of its manufacturing progenitor.

* * *

Aviation's Growth Depends on Public's Idea of Safety

SAFETY—that has been and still remains the chief bar to rapid development of passenger transportation by air. Flying is safer today than it ever was before, unquestionably. But the popular imagination will be stirred always more deeply by the death of a Woolson or a Fahy than by innumerable yards of statistics about fatalities per mile flown.

Likewise the continued success of a Lindbergh does much to offset in that same popular imagination the fear of flying engendered by the scores of important accidents still making the front pages of newspapers concerning men and ships engaged in the thoroughly prosaic business of transporting or being transported from one place to another. The number of fatal accidents with-

in the last twelve months, which could not by any stretch of the imagination be attributed to stunt flying have not helped accelerate the development of commercial aviation.

And yet the time will come, without question, when most people will fly, casually and as a routine part of their regular existence. In the meantime, all power and glory to those men who still are pioneering.

* * *

Val Haresnape—The Working Leader in American Racing

VAL HARESNAPE, who died last week in Los Angeles, was the best known and hardest working individual ever to hold the position of Secretary of the Contest Board, American Automobile Association. His two terms were marked by outstandingly aggressive administration and broadening of the Board's functions.

Haresnape knew the racing business. A mine of pertinent historical, statistical and human race data was at his finger tips. It is said of him that he could name instantly all place winners to 5th of every major contest during the past eighteen years. Perhaps Val Haresnape's outstanding characteristic was a sense of duty that knew no middle ground. He was relentless in opposition to misstatement and evasion. He believed himself insusceptible to the toll of consistent overwork. It was characteristic of the man that on his last assignment as director of the Daytona Beach trials he carried on, despite an almost daily physical collapse.

* * *

Gliding Has Training Aspect as Well as Sports Angle

UNTIL recently we haven't been able to get up much interest in gliders. Their practical significance has been diffi-

cult for us to see. The doors of our ignorance were opened the other day, when we read an article which is to appear in an early number of *Automobile Trade Journal*, written by Lieut. Ralph S. Barnaky, Construction Corps, U. S. Navy, first licensed glider pilot in the United States.

No more interesting discussion of gliders for the layman has ever been written, to our way of thinking. As to use, the author points out that, first of all, gliding is a thrilling, relatively safe sport. He then voices his belief that ten minutes' flying time in a glider will cut down by five hours and a number of dollars the training hours in the air necessary to make competent airplane pilots. He mentions other uses, but doesn't suggest the glider as a transportation unit in itself.

* * *

Stock Market Performance Fades to Insignificance

LAST week we spent talking with automotive executives of all kinds in Cleveland, Detroit and points West. We were strongly impressed with what we didn't hear about the stock market.

Six months ago a similar trip would have netted at least a bag and a half full of hot tips absolutely sure to make a fortune for the quick-witted investor. Nowadays it's a skillful miner who can dig a guarded opinion on stocks out of any automotive man.

That's not entirely because of caution, either. Plenty of automotive men seem to us to have just naturally forgotten Wall Street and the market altogether. Far from worrying about it any longer, they aren't thinking of it at all.

That's a darned good sign, don't you think?—N. G. S.

Driver's Financial Responsibility Laws Enhance Safety



But Chamber of Commerce of the United States, in session this week, confirms earlier pronouncement against the so-called compulsory insurance legislation.

By LESLIE PEAT

AUTOMOBILE men will be interested in the disposition of the question of compulsory insurance, which will be brought up for consideration on April 28 at the eighteenth annual meeting of the Chamber of Commerce of the United States, at Washington.

The insurance department committee of the chamber proposed a declaration which, while confirming the earlier pronouncement against compulsory automobile insurance, would recognize the basic principles involved in the so-called financial responsibilities laws as equitable and conducive to improving safety on the highways.

The experiences of insurance companies in Massachusetts, it was pointed out, where automobile drivers must take out insurance under provisions of state laws after they have been found guilty of any one of the several of the more serious traffic violations, has been closely watched by the automobile industry. The consensus seems to be that automobile men are not generally strongly opposed to state laws requiring compulsory insurance after an operator has been convicted of one of the major traffic offenses, such as habitual speeding, driving without a license, driving while intoxicated or being involved in an accident where negligence on the part of the driver can be proved, or leaving the scene of an accident.

Wary of Commission Powers

On the other hand, spokesmen for the industry are wary of all state legislative proposals which would give wide power to commissioners in charge of the enforcement of the laws. In New Jersey, for instance, the commissioner of highways can demand insurance in all cases of violation of 38 separate counts, many of which have no reference to safety.

Another example of what the industry believes to be an oppressive piece of legislation is the New York law which makes the state collector of judgments against the motorists. It is held by considerable legal opinion that the theory of this legislation is erroneous, in that judgment collecting is not properly a function of the state. Such a provision might well lead to

"ambulance chasing" practices on the part of some lawyers, and would result in the institution of hundreds of lawsuits.

In the case of the New York law, and true of financial responsibility laws generally, any piece of legislation which attaches a penalty such as the obtainment of insurance, or posting of bonds after the accident, would seem to make more hit-skip drivers. Figures to prove this contention are not available, but police officials in a number of cities have made something of a study of this condition, and have found this to be the tendency, at least. Certain classes of drivers will succumb to the temptation to escape after having caused an accident, if they feel that they have not been identified, with the prospect of compulsory insurance facing them if they are caught.

Compensation Unenforceable

A number of students of this whole problem feel that neither compulsory insurance nor financial responsibilities laws can ever be enforced to actually provide compensation for the injured, an avowed intention of the proponents of these measures.

What they do is to guarantee the collection of a judgment, if and when one can be obtained, by putting the matter in the hands of trained insurance company attorneys, the injured persons would find it doubly hard to get these judgments. The experience in Massachusetts seems to have demonstrated that the plaintiff in cases of accidents have not fared well at the hands of the specialists at the bar.

Automobile clubs seem to have agreed that these laws of compulsory insurance and financial responsibility are in no sense safety measures. Proponents have been challenged repeatedly on this point, and have been able to show no substantial statistics to prove this contention, often made in support of this type of legislation.

As a result, spokesmen for automobile owners, dealers and manufacturers are agreed that the purposes of these proposed laws are to increase the business done by insurance companies.

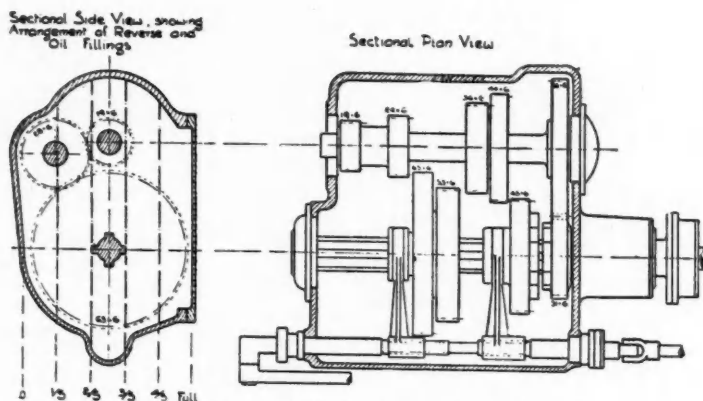


Fig. 1—Lay-out of the transmission tested

At a recent meeting of the Institution of Automobile Engineers a paper on Measurements Made of the Power Loss and Efficiency of a Motor Lorry Gearbox was presented by J. H. Hyde and F. Aughtie, Ph.D. The information given is of particular interest in that efforts were made to separate the losses due to different causes and that the losses were measured directly instead of being obtained by subtracting the output from the input, which latter method is subject to considerable inaccuracies. As shown in Fig. 1, the gearbox tested was of the type having its two main shafts in the horizontal plane.

Two series of tests were made, the first series in direct drive and third forward speed, up to the normal full load, which served the purpose of separating the various losses; the second series was made on the two lower forward speeds, up to loads and speeds considerably beyond normal, the object being to confirm the results of the first series and to determine the efficiency of the transmission under extreme conditions.

The arrangement of the transmission and dynamometer for the first series of tests is shown in Fig. 2. The transmission was mounted on a tilting frame supported in ball bearings by means of trunnions. On each side the frame carried a torque arm fitted with a knife-edge stirrup and scale pan. For the second series of tests, when the reaction torque on the box was considerable, the round-bar supports on which the transmission was clamped were extended to form the torque arms, and the load was suspended from a steel ball mounted in a member attached to these rods at their ends.

Input power was supplied and measured by an

electric motor dynamometer, the field of which carried torque arms and was mounted in roller bearings concentric with its armature shaft. In this way the input torque was determined directly by mechanical means, and no corrections for bearing and brush friction were necessary. Calling the torque on the field frame of the driving motor T_1 , the torque on the gearbox T_2 , and the torque on the driven shaft T_3 , it is shown that the loss of power in the transmission is

$$k \times N_1 \times \left(T_1 - \frac{1}{R} (T_1 + T_2) \right)$$

and hence the frictional torque referred to the input shaft is

$$\left(T_1 - \frac{1}{R} (T_1 + T_2) \right)$$

Since the input torque and the frictional torque were both measured it was unnecessary to measure the output torque. This was of advantage when testing the transmission on the higher-reduction-ratio gears, as it permitted the interposition of a speeding-up gear between the transmission under test and the hydraulic dynamometer used to absorb the power.

The power loss in a transmission may be divided into two parts, one independent of and the second dependent upon the power transmitted. To the first belong such losses as those due to packing gland friction and churning

of the oil by the gears; to the second belong the losses due to friction between the teeth of the gears and, to a minor extent, bearing friction. The transmission, however, was fitted with ball bearings throughout, the losses in which increase only very slightly with

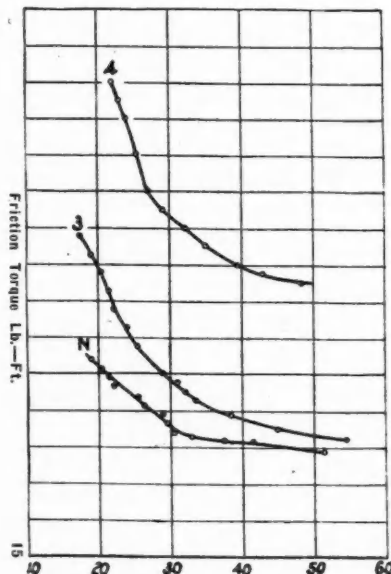


Fig. 3—Variation of friction torque (measured on input shaft) with oil temperature

(Zero input load, case two-fifths full of BB oil)

in Transmissions Direct Tests

glish engineers indi-
with viscosity and
in the case, and with
and engine speed.

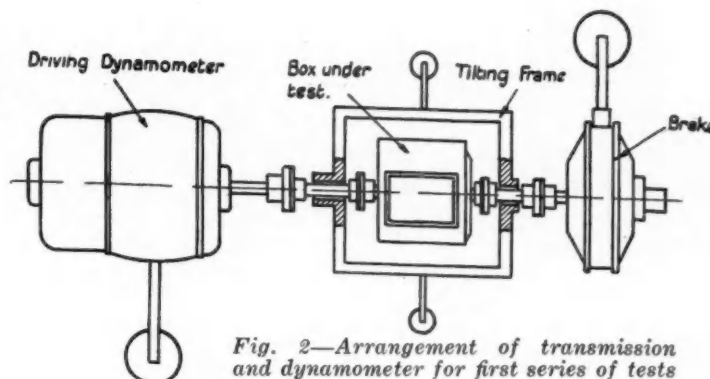


Fig. 2—Arrangement of transmission and dynamometer for first series of tests

load. The two classes of loss are referred to as zero-load loss and net-load loss, while the corresponding frictions, in all cases referred to the input shaft, are referred to as zero-load friction and net-load friction. The latter, for any given load, is equal to the difference between the total friction at that load and the zero-load friction.

Preliminary experiments indicated that the predominating zero-load loss was that due to the viscosity of the oil, which explains why this loss varied considerably with temperature and with time, since the churning of the oil by the gears heated it. To eliminate temperature effects as an independent and variable factor, a series of readings were taken as the temperature increased, all other factors remaining constant. This procedure was repeated as often as necessary, only one variable being changed at a time. The readings so obtained were then plotted against oil temperature, and from the graphs thus obtained

the value of the quantity could be read off for any particular oil temperature. By this method the effect of the following factors on the zero-load loss was determined:

- (1) Viscosity of lubricant.
- (2) Nature of lubricant.
- (3) Quantity of lubricant.
- (4) Input speed.
- (5) Gear ratio.

It was found that the nature of the oil had little effect on the zero-load losses except in so far as it affected the viscosity. The results from all of the oils employed are plotted upon the same chart, Fig. 4, the viscosity on the logarithmic scale at the bottom and the friction torque in lb.-ft. on the vertical scale. The anomalous results from oil C are ascribed to its abnormally high viscosity, as a result of which the wheels tended to cut passages in the bulk of the lubricant, which filled with either air or with lubricant of higher temperature, and hence of lower viscosity, than the bulk of the lubricant. This effect is referred to as "cavitation."

The quantity of lubricant was found to have a great effect upon the zero-load losses at all speeds and gear ratios, up to the point where all gears were completely submerged in oil, after which there was no further increase in the loss. The variation of the friction torque with the quantity of oil in the box is shown in Fig. 4 and attention is called to the fact that the loss is greatest when the transmission operates in direct drive, which it does the greater part of the time in service.

The variation of the friction loss with speed is shown in Fig. 5. With some lubricants the curves were concave and with others

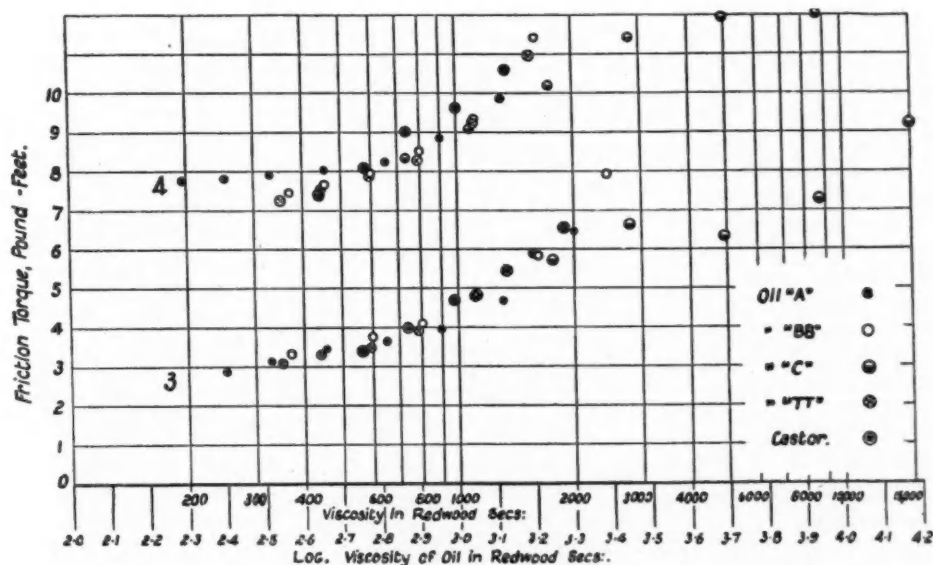


Fig. 4—Variation of friction torque (measured on input shaft) with quantity of oil in case

(Input speed 1000 r.p.m.—Zero output torque. Lubricant, BB oil at 104 deg. Fahr., viscosity, 600 Redwood seconds)

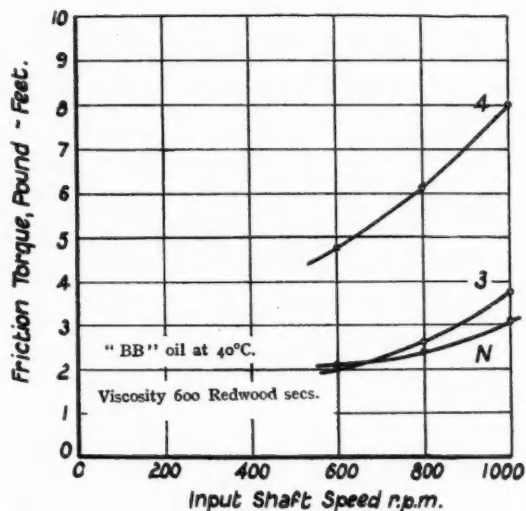


Fig. 5—Variation of friction torque (measured on input shaft) with speed
(Zero output load, box two-fifths full of oil)

Fig. 6—Variation of efficiency with quantity of oil in case (BB at 104 deg. Fahr.)
(Input, 150 lb.-ft. at 1000 r.p.m. equal to 28.5 hp.)
(Input shaft speed, 1000 r.p.m.; case two-fifths full of oil at 104 deg. Fahr.)

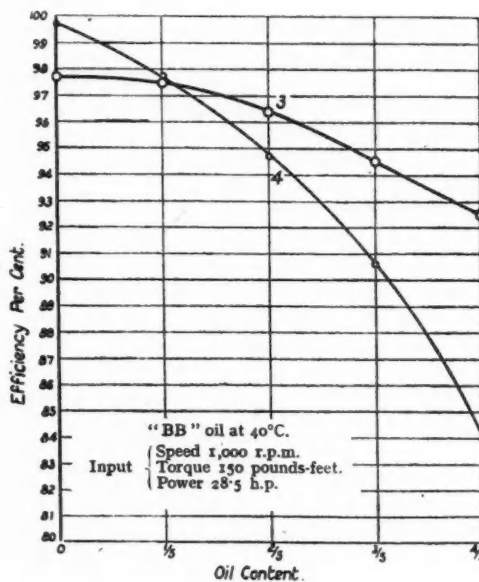
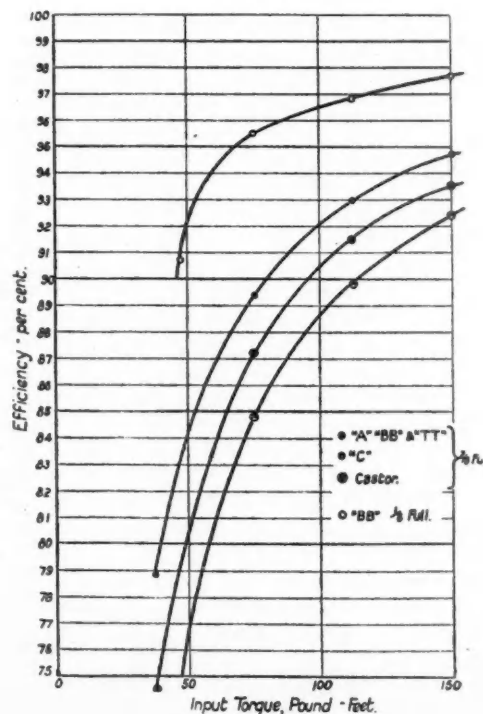


Fig. 8 (below)—Relation between efficiency and load in direct drive
(Input speed, 1000 r.p.m.; oil in case at 104 deg. Fahr.)



On direct drive the losses in the transmission remain the same under load as with zero-output load. Tooth friction is dependent upon the contact pressure between teeth, and in the first series of tests the results indicated that the net-load friction increased less rapidly than the load, but in the second series, when the loads were considerably increased, the relation was very closely linear, with a tendency to increase more rapidly at the high loads, due probably to a rupture of the oil film at the high loads.

For the loads covered by the first series of tests the tooth friction varied but little with the nature of the lubricant and it was found that under these conditions castor oil has no advantage over the usual mineral oil. The tooth friction varied irregularly with oil viscosity, which is thought to be due to the temperature of the oil between teeth not being directly related to the temperature of the bulk of the oil.

In an effort to determine the effect of speed upon tooth friction the transmission case was supplied with castor oil and was filled only one-fifth full, so as to minimize the churning loss. Owing to limitations of the braking equipment the tests were made at one-half full load. While the total loss was found to increase with speed there was no appreciable change in net-load friction with speed.

Fig. 6 shows the variation of the efficiency at nominal full load with quantity of lubricant for both gears. Attention may again be drawn to the serious decrease of efficiency of the

they were convex toward the horizontal axis. This change in character is probably due either to cavitation or to the tendency of mating wheels to throw oil on each other. The extent to which one or the other of these two causes influences the friction torque depends upon the quantity and viscosity of the oil in the transmission. With high viscosity and normal filling (two-fifths full) the effect of cavitation predominates, and the friction increases at a lower rate than the speed; when the oil is less viscous and the speed moderate, the loss is proportional to the speed, suggesting that the flow of the oil is entirely streamline. With higher speeds and lower viscosities the loss increases roughly as the square of the speed, indicating that the flow is almost wholly turbulent.

The gear ratio affects the friction torque only because it changes the speed of the output shaft, which for the same friction on this shaft gives a smaller loss of power.

The net-load friction is comprised almost entirely of the tooth friction, the increase of bearing friction being negligible. This friction may be expected to vary with the gear ratio, the load transmitted, the nature of the lubricant, the viscosity of the lubricant and the speed of the shafts (assuming constant torque).

direct drive when an excess of lubricant is employed.

From the first series of tests the following conclusions were drawn:

1. The total loss of power is due to two main causes, one, the viscous resistance to rotation of the gears in the lubricant, and the second, the friction between the teeth of the gears. The former is independent of, and the latter dependent upon, the load transmitted.

2. In the direct-drive position oil churning is the cause of nearly the whole loss of power, and this loss may have a very serious effect on the efficiency of the transmission if too much or too viscous an oil is used.

3. The tooth friction is small for the normal full load of the transmission and varies little with changes in the nature or viscosity of the oil. While this might not hold when the lubricant is scanty, it applies when the quantity of oil is reduced below what would probably be regarded as the normal level.

4. The tooth friction is practically unaffected by changes of speed.

The second series of tests covered operation of the transmission in first and second gear. A lubricating oil was used and the case was filled only one-fifth full, this allowing at least one of each pair of mating gears to dip into the oil. The tests were extended to a torque corresponding to 100 hp. at 1000 r.p.m. at the input shaft and to speeds of 1750 r.p.m. Results of efficiency tests in all four speeds are shown in Figs. 7 to 10. Attention is called to the high value of the efficiency with the lubrication employed. That the efficiency becomes high only at considerable loads in first and second speeds

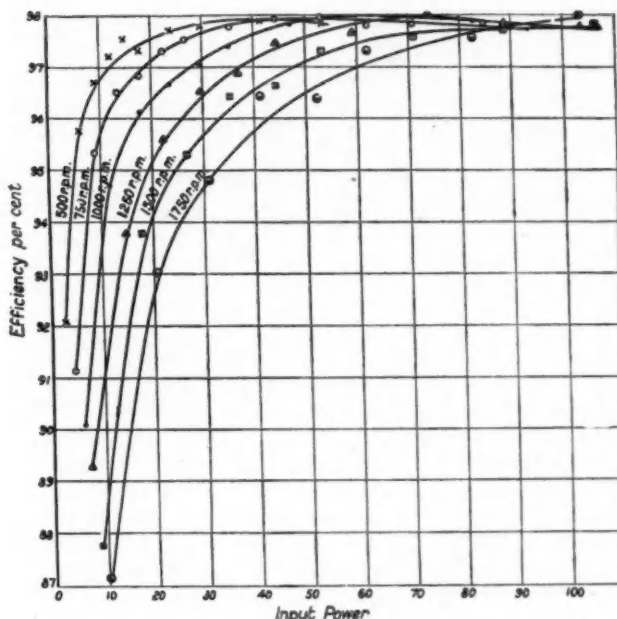


Fig. 10 (above)—Relation between efficiency and load on input shaft in second gear

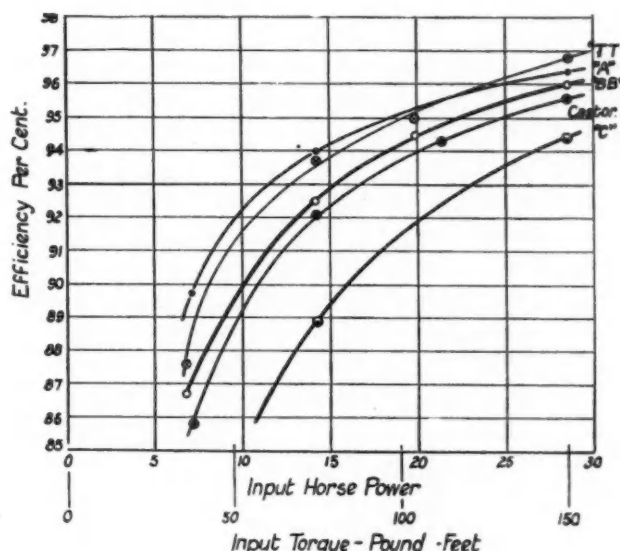


Fig. 7—Relation between efficiency and load in third gear

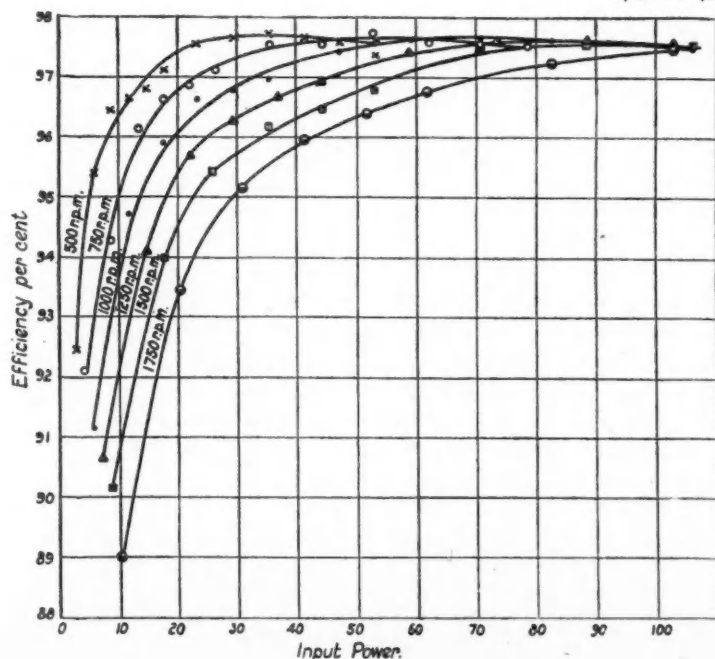


Fig. 9—Relation between efficiency and input load in first gear

shows that the zero-load losses are still a high proportion of the total loss and suggests that either the quantity of lubricant should be still further reduced, a pump being introduced to spray the gear teeth with oil if necessary, or else that the rated power of the transmission is well below its capabilities. The authors call attention to the excellent consistency of the results, the observation points in most instances lying on smooth curves. This second series of tests, the authors point out, justifies the conditions of lubrication employed. Up to powers equivalent to an overload of 250 per cent there were no signs of the lubrication being inadequate, and the transmission ran cooler than when operated in direct drive at 1000 r.p.m. when the case was four-fifth full of BB oil.

corresponding to the smaller loss of power, viz., 2 hp. instead of $4\frac{1}{2}$.

From the combined tests the authors draw the following conclusions:

1. An excess of or too viscous a lubricant causes excessive loss of power in the direct-drive position.

2. Adequate lubrication of the indirect gears is given by a supply of oil just sufficient to cover at least one of every pair of mating gears in the transmission case.

3. An oil of moderately low viscosity gives satisfactory lubrication and low churning losses.

Lamblin Fuel Pump

TWO opposed springs of different strength, operating a diaphragm, constitute the outstanding and the patented feature of the automobile gasoline feed pump just put on the market in France by the Lamblin Co. The body of the pump, as shown in the illustration, is an aluminum die casting having very few machined parts. Gasoline enters through the union *A* and after passing through the filter *C* reaches the inlet valve *E* and passes out through the discharge valve *F*. The diaphragm *D*, which is bolted between the outer face of the pump and the face of the pump support, is operated by the two springs *H* and *K*, of different strength. The spring *K* is carried within a guide operated on by a cam, preferably cut on the camshaft. On an alternative model provision is made for operating it through a rocker and lever, where direct cam operation is not available.

With the cam in its neutral position, spring *K* is completely expanded and the diaphragm is operated on by the lighter spring *H*, this movement of the diaphragm constituting the intake stroke of the pump. When the cam compresses both springs, *K* and *H*, the diaphragm executes its delivery stroke, and it is these two movements of the opposed springs which assure an output to meet the requirements of the engine.

When the carburetor needle valve seats, an increased pressure is created on the valve *F* and on the face of the diaphragm nearest to the valves. This additional pressure, added to the pressure of spring *H*, maintains the diaphragm in the neutral position shown in the drawing, and equilibrium is maintained between the lighter spring *H* and the heavier spring *K*, whatever the position of the cam. The pump does not begin to aspire again until the carburetor needle valve lifts, reducing the pressure on the valve side of the diaphragm, and allowing it to pulsate.

The diaphragm features of this pump are similar to those of the Lamblin aviation pump introduced about eight years ago, but the system of obtaining pulsations

and a self-adjusting supply of gasoline by means of two springs is entirely new.

This pump has been thoroughly tested both in the laboratory and on Montlhéry track, with very satisfactory results. It is maintained that it will be fitted as standard next season by some of the leading automobile manufacturers in France and England.

Franklin Engine Production

(Continued from page 689)

in one set-up on the W. F. & J. Barnes special boring machine, shown in Fig. 14. This machine has a rotary table holding two fixtures, permitting the loading of a crankcase while one is being bored. Although this is a single drive machine, it is designed to accommodate another head at the opposite end, making the machine convertible into a double-end high-production tool. The crankshaft bearing bores are finished to 2.653-2.655 in. while the camshaft bores are finished to 1.747-1.749 in.

On a special boring machine made by themselves, one additional cut is taken on the crankshaft bearing bores; the inside of the No. 1 crankshaft bearing is faced to length and the Welch plug hole is counter-bored in the end of the No. 4 camshaft bearing. In the final operation the crankcase is burred completely, inspected and chipped where necessary. It is then thoroughly washed and passes down to the final inspection bench. At the assembly operation main bearings are selectively reamed to fit the crankshaft.

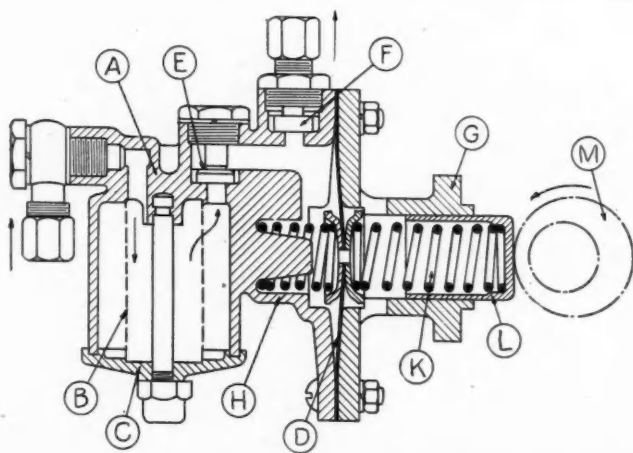
Looking back over this machine shop layout, one can visualize the painstaking care devoted to making each distinct step controllable within accurate limits. Too, the clearly defined objective of adapting universal machines insofar as possible is also well worth emphasizing since this is a vital economic factor in the planning of a moderate production layout.

Finland's Automobile Imports

THE following table shows the gradual increase in the imports of automobiles and motor trucks into Finland:

Year	Passenger Cars	Commercial Vehicles
1925	4,111	61
1926	5,138	17
1927	5,672	151
1928	6,631	70
1929 (8 months)	2,940	35

The number of commercial vehicles imported seems to be quite small, but this is due to the fact that motor trucks generally are imported in chassis form and are fitted with bodies upon arrival in the country.



Sectional view of Lamblin fuel pump

Rolls Royce Develops Aluminum Alloy Termed

Castings for the crankcase, cylinder block and head of engine in plane which won the Schneider Trophy were made of this metal

"Hiduminium"

IN a paper read before the British Institution of Production Engineers, W. C. Devereux (managing director of High Duty Alloys, Ltd.), discussed some recently introduced aluminum alloys, particularly one known as "Hiduminium R.R. 50," which is the outcome of research by Hall & Bradbury, chiefs of the Rolls Royce laboratory at Derby, England. This material is now used, Devereux stated, for all light alloy castings by Rolls Royce in cars and aero engines; it is regarded as a certainty that the forgings now used by them in other aluminum alloys will in future be made of R. D.50. The crankcase, cylinder block and cylinder head and other aluminum castings of the Rolls Royce Schneider Trophy engines last year were of this alloy. The composition is as follows:

	Per Cent
Copper	0.5 to 5.0
Nickel	0.2 to 1.5
Magnesium	0.1 to 5.0
Iron	0.6 to 1.5
Titanium	Up to 0.5
Silicon	0.2 to 5.0
Aluminum	Remainder

For the various applications the elements are divided into four grades: (1) for sand and die castings for general purposes; (2) for die castings for pistons; (3) for forgings for general purposes; and (4) for forgings suitable for high quality pistons. All grades of the material are capable of being strengthened by heat treatment. The forgings have a high-temperature heat treatment, and after quenching, are subjected to an aging process; the castings are subjected to a low-temperature treatment. The temperature for the treatment of the castings is not higher than 175 deg. C., so that distortion or cracking during quenching is obviated.

The casting and forging of this material, Devereux asserted, is undoubtedly easier than in any other known aluminum alloy, but the machining calls for some little extra care. The minimum figures to be expected in this alloy are given in the accompanying table.

It has been found unnecessary to use chills. The material is very fluid, and high temperatures for casting thin sections can be adopted without detriment.

The pattern should be studied and ample provision should be made for getting large runners and risers well distributed. It is desirable to get the metal into the mold as quickly as possible, and to have sufficient material in the runners and risers to continue feeding the casting while

shrinkage is taking place. One need not be afraid that the runners and risers, owing to their size, will cause draws. Chills should not be considered as a means of overcoming draws, unless the place to be chilled is in some isolated part of the casting and cannot be fed. The temperature of pouring for the average casting is from 700 to 720 deg. C., but for extremely thin sections higher temperatures can safely be adopted. An increase of temperature overcomes the tendency to draw in a portion of the casting.

The majority of castings in this material can safely be left in the moulds for a considerable period, and it has not been found necessary, even in the case of the most delicate castings, to break out the core sand until the castings are practically cold. This is an obvious advantage in production.

In the majority of cases heat treatment is not necessary, but for particularly highly stressed parts the treatment necessary is to heat the casting to 175 deg. C., holding it there at least 16 hr., and quenching in water. All casting can be carried out safely in green sand molds.

R.R. alloy is a little more difficult material to machine. The cutting rakes of the tool need to be at a greater angle than in the case of some alloys. The effect of the addition of titanium is that of a cleanser.

As to die casting, the material was very easily die cast, and Rolls Royce, when going over to this material, did not find it necessary to make alteration to their dies. He himself had done some die casting,

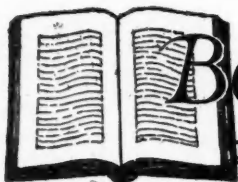
"Hiduminium" R.R. Alloys

Specific Gravity 2.73

No.	Test Piece	0.1% P.S. Tons in ²	Y.P.S. Tons in ²	U.S. Tons in ²	Elongation % in 2 in.	Redn. of Area %	Brinell Hardness
R.R. 50	Sand Cast Alloy—						
	As Cast	7	8-9	10-11	4	8	65
	Heat treated	10.5-11.5	..	11-13	3	5	72
R.R. 50	Chill Cast Alloy—						
	As Cast	7	8	14-15	7-10	12	72
	Heat treated	12-14	14	16	4-8	10	80
R.R. 53	Die Cast Piston Alloy—						
	As Cast	12	13	14	3	4	80
	Heat treated	22	23	23-25	1	1½	132-152
R.R. 56	Forging Material						
	Heat treated	23-25	24.5-27	28-32	10-20	14-25	121-160

and found it advisable to make the runners and shrinkage pads 30 per cent greater than was usual for ordinary alloys. Generally in die casting there was a tendency to keep the runners and risers and shrinkage pads on the small side, for reasons of expense.

From experiments he had carried out he had every reason to believe that extruded bars would be satisfactory. Hitherto all the material in bar form had been forged. Experiments were also going on with rolling.



Books for the Business Bookshelf

Materials of Engineering Construction

By Francis W. Roys, Professor Mechanical Engineering at Worcester Polytechnic Institute. The Ronald Press Co., New York.

THIS book was written as a text for the student of engineering, to enable him to obtain a close acquaintance with the characteristics and properties of the more common and the most widely used materials of engineering. No attempt was made to produce a manual of engineering materials, so the author states in his preface, the aim having been to present the subject in as concise a manner as possible so as to conserve the time and the energy of the student. The materials dealt with are wood, lime and plaster, hydraulic cements and concretes, structural clay products, building stone, ferrous metals, non-ferrous metals and alloys, and paints and varnishes. Separate chapters are devoted to corrosion of metals, temperature effects on metals, and failure of material under repeated stress.

Since all of these subjects are covered within the space of 300 pages, it may be imagined that only the fundamentals are dealt with. However, numerous references to sources of more detailed information are given for the benefit of those who need it. The book is well illustrated.

The Five-Day Week in Manufacturing Industries

National Industrial Conference Board, Inc., 247 Park Ave., New York. 69 pages. 14 tables.

HERE is a comprehensive study of the five-day week based on the actual experience of 270 companies employing 216,921 persons. This report deals in detail with the technique of the five-day schedule touching on such questions as the length of the working day, adjustment of wage rates, and overtime arrangement. It also discusses the experiences of individual employers with the five-day week and what they say about its effect upon production, operating economies, advantages and disadvantages.

National Advisory Committee for Aeronautics' Fifteenth Annual Report (1929)

THE National Advisory Committee for Aeronautics recently issued its Fifteenth Annual Report, for 1929. The Administrative Report is published separately, without the technical reports. In the report a general review is given of the activities of the committee during the past year and covers practically all phases of aeronautical development. Thus under the heading of General Activities are listed a Study of Aircraft Accidents, Consideration of Aeronautical Inventions, Rigid Airships, the Daniel Guggenheim

Fund for the Promotion of Aeronautics, Cooperation With the State Department Abroad, With the British Aeronautical Research Committee, and With the Army and Navy, Investigations Undertaken for the Army and Navy, and Exhibit at the Seville International Exhibition. The Report also gives a survey of the work of the technical committees and abstracts of the technical publications issued by the committee.

"Principles of Electroplating and Electroforming (Electrotyping)"

By William Blum and George B. Hogaboom. (Second Edition, 424 pp.) 1930. (First Edition Published 1924, 356 pp.). McGraw-Hill Book Co., New York.

IN this revised edition of one of the few texts available in English on electroplating, the authors have endeavored to make every statement as accurate as possible and to explain all their facts in the simplest manner. This has been done due to the increasing number of platers who have come to a realization of the value of chemistry in electroplating processes and their desire to obtain authentic information which they can understand and use. This edition contains a chapter on chromium plating which at the time the first edition was published was but little known. All the remaining textual matter has been checked and revised to conform recent experience and results of tests conducted by the authors at the Bureau of Standards and as disclosed in research and industrial laboratories. The book first presents those principles of chemistry and electrochemistry upon which electroplating is based, then includes chapters on the electrodeposition of copper, nickel, cobalt, iron, lead, zinc, cadmium and other metals which can be deposited electrolytically. The necessary equipment (tanks, generators, etc.), is also described. An extensive appendix gives tables electrochemical equivalents, specific gravities of electroplating solutions, densities of acids and similar data.

Storage Batteries

By George Wood Vinal (second edition). Published by John Wiley & Sons, Inc., New York.

THE author of this book is physicist at the Bureau of Standards and the book deals more with the physical and chemical aspects of the storage battery than most other books on the subject. The first edition appeared five years ago and the author has taken advantage of the need for a new edition to revise his text and add new material on developments in the storage battery field during recent years. Methods of manufacture have been changed in some respects and new additional material on battery performance has become available. A section on aircraft storage batteries added is of particular interest from the automotive standpoint.

*Focke-Wulf Hawk mono-
plane, which is said to be
proof against spin*



Focke-Wulf Hawk Has Modified Taube Wing

A NEW plane developed by the Focke-Wulf Aircraft Co., of Bremen, is claimed to possess the valuable property of such great natural stability that it cannot be put into a spin by the pilot voluntarily and that it cannot go into a spin accidentally. A dozen large ten-passenger planes of Focke-Wulf make are in use by the German Luft Gansa, and when they were being taken over and subjected to the acceptance tests it was noticed that they possessed unusual lateral stability, which was ascribed to the shape of the wings, the latter being reminiscent of those of the German Taubes (pigeons).

The Taubes were exceptionally stable on account of the sweep-back of the wing tips. Of course, these wings lack the lifting power of modern wings, the influence of form and thickness on lifting power not being understood at that time as it is today.

Bird-Wing Effect

The Focke-Wulf wing is admittedly a modified Taube wing, but the wing tips are not definitely swept back as they were in the earlier design. The ailerons are so fitted that their leading edges when produced toward the fuselage would meet at a point of the latter slightly behind the longitudinal center, or, more exactly, at about three-fifths of the fuselage length from the propeller hub, not counting the rudder. The ailerons, moreover, are comparatively small. A bird-wing effect is obtained by the trailing edge of the wing ending in thin, inwardly curved and sharp edges between the ribs.

Last summer a new model, the Hawk A-28, a small plane for five passengers and a pilot, was completed for the Wilhelmshaven-Rustringen Air Transport Co. and was submitted to acceptance tests by Pilot Schultz of the German Aeronautical Research Institute. During these tests Schultz was much impressed with the fact that it was simply impossible to induce the machine to spin. He reported this to headquarters at Berlin. Later Chief Pilot von Koeppen of the Institute flew the machine for nearly 1½ hours successively with three different load distributions. With all of these load distributions the machine was positively proof against spinning.

These and other tests confirmed reports concerning two accidents that had met with considerable in-

By EDWIN P. A. HEINZE

credulity. Both had occurred with the large machine, the Moeve, and in one of them the pilot upon landing had accidentally cut off the ignition too early, with the result that the machine fell practically vertically from a height of 150 ft., landing on an even keel and sustaining damage only to the landing gear. In the second case, owing to faulty weight distribution, the pilot was compelled to land again after starting. He had to fly the machine in a squally wind and in the stalled position practically around the field, but before he was able to bring her down safely in the usual manner, she suddenly settled through the air and came down on an even keel.

The new Hawk model, herewith illustrated, is designed along the same lines as the older machines, being of wood, wire and fabric construction. The wings are of the cantilever type and the span is 52½ ft. It is equipped with a five-cylinder air-cooled radial Gnome & Rhone engine of 240 hp.

The weight of the machine when ready for flight is 2420 lb., and the load capacity amounts to 1540 lb., so that the flying weight is 3960 lb. The wing load amounts to 11.5 lb. per sq. ft. and the motor load to 16.5 lb. per hp. The maximum speed is given as 112 m.p.h. while the touring speed is 95 m.p.h. and the landing speed 55 m.p.h.

Truck Frame Construction

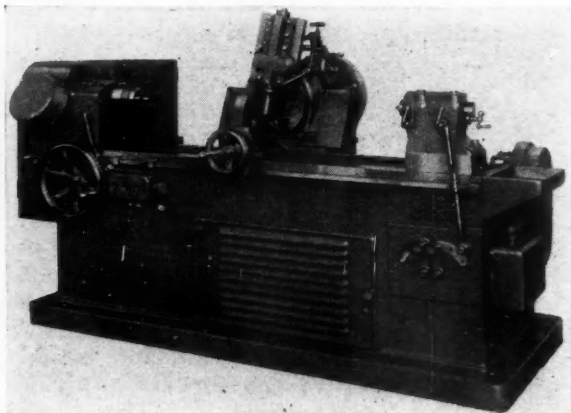
THE Oesterreichische Automobil Fabrik-Gesellschaft of Vienna, formerly known as the Austrian Fiat Company, has introduced a new one-ton truck chassis of which the frame is, roughly, of X construction viewed in plan, with a transverse member at the rear where it is supported by a single transverse semi-elliptic spring. The side rails are parallel as far back as the clutch housing; from there they converge until they become parallel again, a few inches apart, to a point just in front of the rear axle center.

NEW DEVELOPMENTS—AUTOMOTIVE

ADAMS HOBBER AND MILLER

RAPID production of multiple splined shafts, spur and helical gears, and similar parts, is said to be facilitated by the gear hobber and thread miller recently introduced by the Adams Co., Dubuque, Iowa. This machine is made in two sizes, the No. 5 for handling work up to 10 in. diameter and 48 in. between centers; and the No. 6 for work up to 10 in. diameter, 24 in. between centers. Longer bar work, requiring cuts not to exceed these limits, can be passed through the hollow spindle and held by means of collet chuck. The standard headstock equipment will accommodate 3-in. diameter stock through the spindle, while special headstock equipment can be provided to accommodate work up to 5 in. diameter. Both machines are also made in a manufacturing type with range restricted to the hobbing of multiple splined shafts and spur gears. These machines are of the same general construction, but include a Timken mounted cutter spindle and a tailstock with full bearing spindle and Timken mounted center. The differential mechanism is omitted and a simplified form of index and feed gearing is employed.

An important feature is a patented, balanced head drive which transmits power to two sides of the hardened cutter spindle. The setting of the head to any desired angle is accomplished through worm and worm wheel controlled by a hand-wheel, and readings to minutes being easily made on the large diameter vernier. The cutter is accurately set to depth in the work by means of the micrometer dial at the front of the carriage. The headstock spindle is a hardened and accurately ground hollow steel forging and is driven by hardened steel worm and phosphor bronze worm gear. An index plate conveniently mounted on the front of the headstock permits the indexing of work for successive milling cuts, as on multiple threaded worms, screws and similar operations.



Adams gear hobber and thread miller

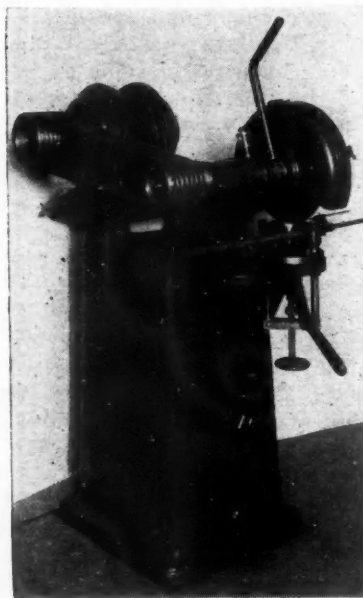
The machine is driven by a 3 hp. 1200 r.p.m. motor in the base, ventilation being provided by louvers in front and rear doors. The drive is carried through a multiple disk clutch and silent chain to an eight-speed sliding gear transmission. The No. 5 machine requires a floor space of $36\frac{3}{8}$ x $93\frac{1}{2}$ in., while the No. 6 takes up a floor space of $36\frac{3}{8}$ x $69\frac{1}{2}$ in.

RADIAC CUT-OFF MACHINE

BEVEL and straight cut-off operations on tubing, bar stock and forms up to 2 in., as well as salvage operations on drills, reamers, etc., are said to be facilitated on the new Type "C" Radiac abrasive cut-off machine just placed on the market by A. P. De Sanno & Son, Philadelphia, Pa. This machine is provided with a special Radiac abrasive cutting disk rotating at 5000 r.p.m. or about 16,000 ft. surface speed per minute. At this speed, materials such as steel,

brass, copper, as well as cemented tungsten carbide, are cut at the rate of 1 sq. in. per sec. Other metallic materials such as stranded steel cable, brakelining and the like are also cut off with facility.

On the cabinet base is mounted a tilting arm which carries the wheel spindle and the motor power is transmitted from a $7\frac{1}{2}$ hp. power motor to the wheel spindle



De Sanno Radiac cut-off machine

through a multi-V-belt drive. The motor is mounted on an adjustable sub-base so that the seven endless V-belts may be put on and taken off readily. The motor is controlled by a push button station located on the front of the machine near the operator.

The work is held in a split V-block and is securely clamped by the movement of one cam lever, which applies pressure equally on each side of the cutting wheel through an equalizer bar. This entire clamping drive may be set so

PARTS, ACCESSORIES AND PRODUCTION TOOLS

as to cut off from right angles to 45 degrees. The weight of the machine with motor is 1200 lb. and the floor space required is 45-in. x 27 in.

BARNES AUTOMATIC LATH

A NEW 16-in. automatic lathe with hydraulic feed and control has been placed on the market by the John S. Barnes Corp., Rockford, Ill., a division of W. F. and John Barnes Co.

In the feed hydraulic mechanism, power for rapid traverse of both front and rear slides is obtained from a pump driven by a chain connected with the motor. Power for feeding both the front and rear slides is obtained from pumps driven and controlled by the main spindle. A single lever controls the rapid traverse and the speed and feed mechanism are operated in response to the rapid traverse action. Speed changes are made by changing the pick off gears while feed changes are accomplished simply by turning dials which are graduated to show the feed in thousandths of an inch per revolution of the main spindle. Feeds for the front and rear slides are set independently, a dial for each being provided.

The spindle rotates clockwise, which is said to be opposite to the usual practice. It is claimed that as a result, the load on the rear tool slide is downward directly against the lathe bed and that the load on the front carriage while upward is also directly against the lathe bed, since the action is a pull on the front carriage bar in the lathe bed.

The new arrangement provides a universal front carriage which can be employed not only to feed the cutting tools into depth and turn

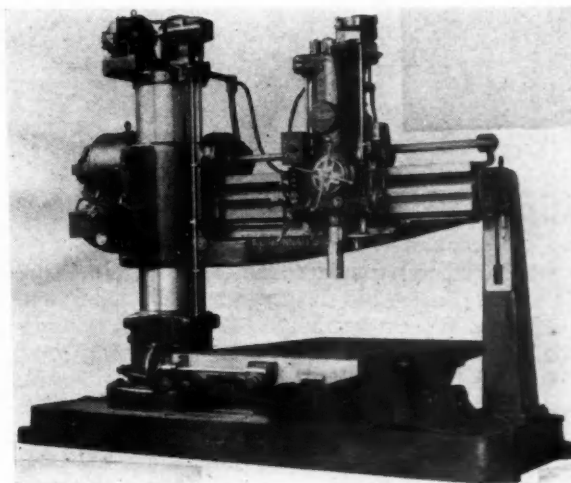
straight but also to turn taper. Adjusting the stop up or down gives the taper desired as the guide bar may be inclined for tapers or horizontal for straight turning.

Recommended motor drive is 5 to 15 hp. at 1200 r.p.m. Floor space required for the installation is 77 x 44 in.

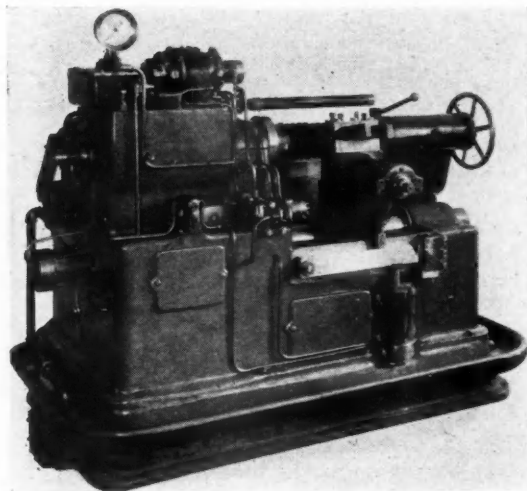
SEVEN-FOOT RADIAL DRILL

A RADIAL drill with special features for accurately boring and drilling be-blocks, large fixtures, etc., for which it is impractical to make jigs, has been built recently by the Cincinnati Bickford Tool Co., Cincinnati, Ohio. This machine, known as their 7 ft. Master Radial Drill, has a 22 in. diameter column and weighs approximately 48,000 lb.

For rigidity the outer end of the arm is secured



Master radial drill, with 22-in. column, for boring large fixtures



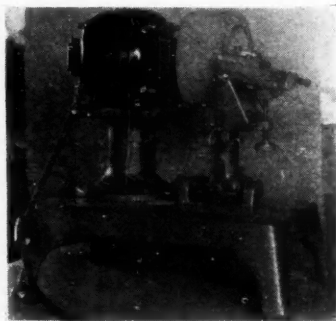
Barnes automatic lathe with hydraulic feed

to a supporting column and held in accurate alignment. A special jig-boring table is located on the base of the machine and is provided with power and hand-operated cross traverse mechanism, and fitted with a micrometer dial indicator so that accurate final adjustments can be made. The head moves along the arm at an exact right angle to the cross movement of the table on the base and the head also is fitted with a micrometer dial indicator so that precise adjustments can be accurately made. All controls for operating this machine are located at the head. Spindle speed changes are secured by means of two back gear levers and rheostat located on the head. A push button controls the clamping and the unclamping of the arm on the column and a lever under the head controls

the vertical movement. For general purpose drilling the outer arm support and special jig-boring table may be removed.

SMALL TOOL SHARPENER

A SMALL bench grinder, for sharpening reamer blades, die chasers, box tool blades, etc., up to 4 in. in length, is announced by the Wells Manufacturing Co., Garfield, Mass.



Wells small tool sharpener

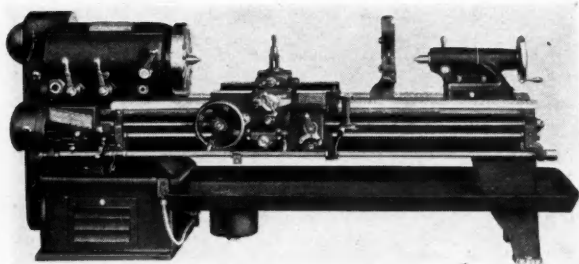
This grinder consists of a small electric motor, 1/6 hp. capacity with a cup wheel mounted directly on the armature shaft. Work is laid on a flat plate, against an adjustable stop and held by a simple clamp. The work-holding plate can be swiveled for any desired taper,

and can be adjusted to grind any bevel on the cutting edge. No slides or bars are used, as the work-holding plate is arranged to swing past the wheel on pivots which are protected from dust and adjustable for wear.

REED-PRENTICE LATHE

FOLLOWING the introduction of their 14-in. and 16-in. lathes last year, the Reed-Prentice Corp., Worcester, Mass., announce the addition of a 16-in. heavy and a 20-in. sliding gear head lathe. These machines incorporate the same features of design as do the two previous models, being especially adaptable for turning with cemented-tungsten-carbide tools at 1250 r.p.m.

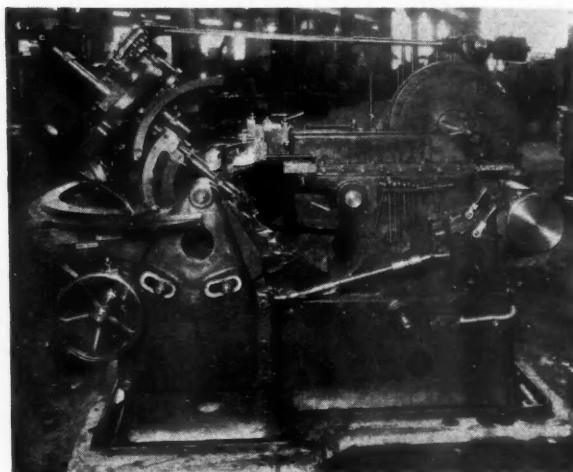
Both new machines are equipped with a heavy duty AC electric motor of 15 hp. rating at 1800 r.p.m. Floor space required is 8 ft. x 3 1/2 ft. x 4 1/2 ft. for the 16-in. heavy and 10 ft. x 3 1/2 ft. x 4 1/2 ft. for the 20-in. model. Net weights are 3750 lb. and 4100 lb. respectively.



Reed-Prentice 16-in. heavy and 20-in. sliding gear head lathe

REINECKER GENERATOR

SIX sizes of bevel gear generators for producing straight, spiraloid or helical tooth forms, recently developed by the Reinecker Co. of Germany are being introduced in this country by the George Scherr Co., 142 Liberty St., New York. The advantages of the Reinecker process are said to lie in the correct shape of tooth profile;



Reinecker bevel gear generator

accuracy of division between teeth, and noiseless running. A suitable tooth grinding machine also can be supplied to further perfect bevel gears generated on these machines. Due to the fact that the ram saddle is adjustable on the three larger machines it is possible to handle gears integral with shafts on these machines.

In operation the gear blank is indexed from tooth to tooth after each stroke, distributing heat generated on the blank as well as the wear of the tool evenly over entire circumference. The machine can be set up quickly and only one set of tools is required to produce a variety of different pitches, reducing investment in tools considerably. The machines are said to be modern in every respect, embodying quick change gear boxes, single pulley, or motor drive on all machines, except the No. O size. The weight of the machines vary from 1650 lb. to 24,650 lb.

WELDING STAINLESS STEEL

"STAINWELD A," a new electrode for welding so-called "18-8 stainless steels," has been placed on the market by the Lincoln Electric Co., Cleveland, Ohio. The rod is of the same chemical as the metal and is coated with a material which in the intense heat of welding forms a gaseous envelope around the arc. It is used with reversed polarity and permits the making of a weld that is said to be as impervious to corrosion as the metal it joins. "Stainweld A" is obtainable in three sizes: 1/8 in., 5/32 in. and 3/16 in. of the regulation 14 in.

lengths, and can be used for horizontal, vertical or overhead welding.

B-K VACUUM BRAKES

BRAGG-KLIESRATH CORP., Long Island City, N. Y., is offering a vacuum brake power amplifier for all models of Ford trucks, and for use with four-wheel and semi-trailers.

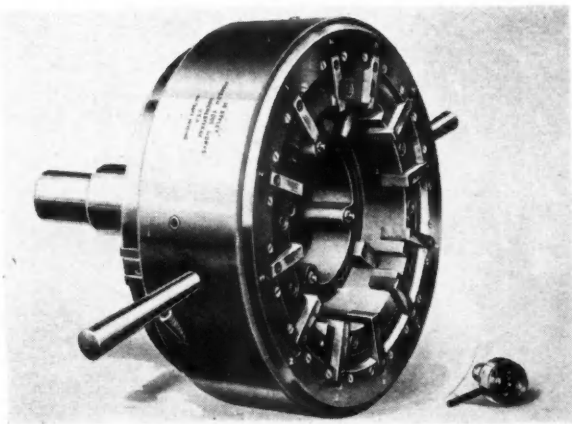
The power cylinder is suspended at the rear from a swivel joint by a bracket bolted to the main cross-member of the chassis. The piston of cylinder is attached by a clevis to power-lever, which is attached to the service-brake cross-shaft. The upper end of the power-lever is extended on an off-set to which is attached the rear end of brake pedal rod and also the external operating valve.

The operating valve, which controls the power brake cylinder, is mounted in the pedal line through a slip-joint which permits the action of the valve without interfering with the mechanical action of brake pedal. This slip-joint passes through the cross-shaft lever, and the power lever acts against this cross-lever in applying brake power.

No parts are disturbed when installing the system, and installation is completed by connecting intake manifold to the valve.

SELF-OPENING DIE HEAD

WHAT is said to be the largest stationary type self-opening die head for turret lathes, with a capacity for cutting threads from 10 in. to 14 1/4 in. diameter, has just been completed by the Modern Tool Works Division of Consolidated Machine Tool Corp., Rochester, N. Y. The outside diameter is 21 1/2 in.; its length less shank is 8 1/2 in. Its size in comparison with the Modern standard 1/2-in. die head is shown in the illustration. This wide range of thread cutting capacity is obtained by the use of a chaser holding



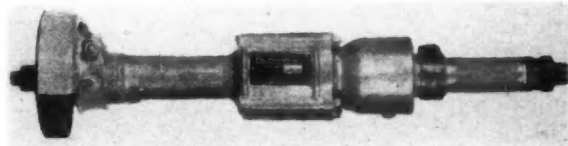
Modern 14-in. die head compared with standard 1/2-in. head

ring which is fitted into the bore of the die head. Chaser slots in the ring and die head are ground together, insuring perfect alignment, the use of this ring giving added support to the chasers when cutting small diameters.

In spite of its size, this die head is said to operate as positively and as easily as smaller die heads, due to the fact that the cam ring is mounted on two sets of roller bearings, one in the front and one in the rear. Every part of the die is hardened and ground throughout.

HERCULES GRINDERS

FOLLOWING the same general design as on their No. 300 series pneumatic grinders for 6-in. and 8-in. wheels, the Buckeye Portable Tool Co. of Dayton, Ohio, has developed two new Hercules Grinders, No. 320-3 and No. 323-3 for



Hercules portable grinder for use with high-speed wheel

use with wheels of 4 in. diameter, either vitrified or high speed. This new grinder is 18 in. overall and 3 in. in diameter, thus making it usable in close quarters. It is equipped with the Hercules special throttle, the Hercules governor, and an oil chamber to insure ample lubrication.

The No. 320-3 runs at 6000 r.p.m. and uses either a 4-in. vitrified wheel or a 6-in. high speed. The 323-3 runs at 9000 r.p.m. and uses a 4-in. high-speed wheel or small cone and pencil grinders. Both machines will be shown for the first time at the American Foundrymen's Association Exhibit, Cleveland Public Auditorium, at Booth 501, May 12.

CINCINNATI HYDROMATIC

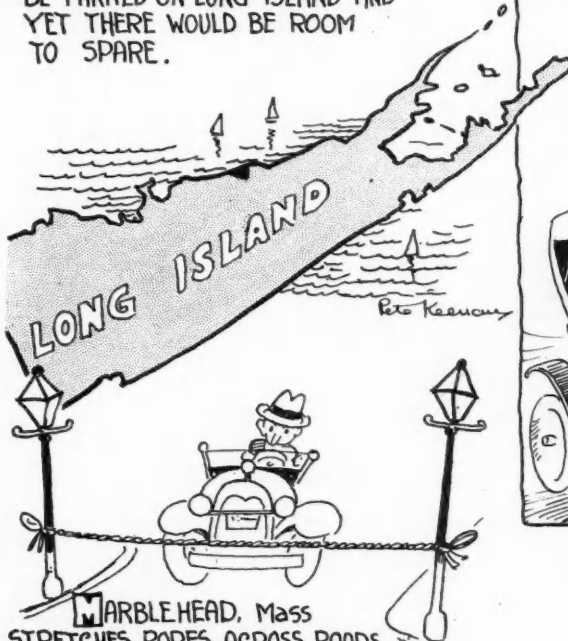
SEVEN more sizes of Hydromatic Millers in both the plain and duplex styles have been added by the Cincinnati Milling Machine Co., Cincinnati, Ohio, making a total of 18 plain and 18 duplex. This gives a range of machines having a table travel of 24 in. to 90 in. with a rating of 5 to 20 hp. in a variety of combinations.

The characteristics of the entire new line are the same as the regular standard Cincinnati Hydromatics. The plain machine is supplied with the one-way or two-way table feed cycle while the duplex machine is supplied with only the one-way cycle. The variable feed attachment and positive stop and delayed trip mechanism can also be supplied with either of the machines.

Automotive Oddities

by Pete Keenan

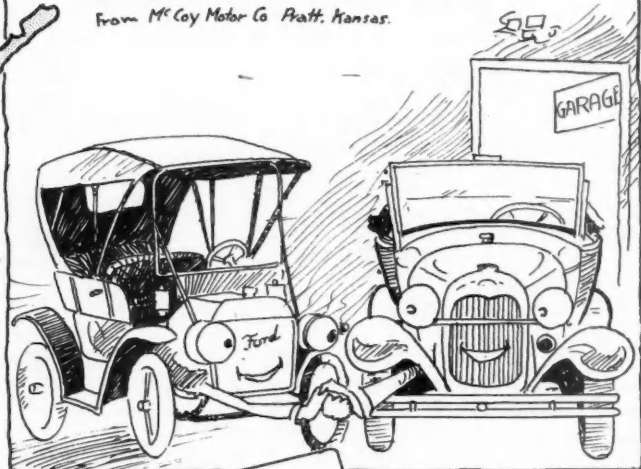
ALL THE PASSENGER CARS, TRUCKS AND PEOPLE IN THE WORLD COULD BE PARKED ON LONG ISLAND AND YET THERE WOULD BE ROOM TO SPARE.



WARBLEHEAD, Mass STRETCHES ROPES ACROSS ROADS ON SUNDAYS.

TWO MODEL "A" FORDS BEARING THE SAME ENGINE NUMBER, "524", MET IN A GARAGE IN KANSAS. THERE WERE 15,000,000 CARS BETWEEN THEM.

From McCoy Motor Co. Pratt, Kansas.



"WHY HAVE TWO CYLINDERS" "MAN HAS ONLY ONE HEART"

EARLY MANUFACTURER'S ADVERTISING IN "HORSELESS AGE."



LEONARDO DA VINCI, THE ITALIAN ARTIST - DESIGNED THIS PLANE, INVENTED THE FIRST PARACHUTE, AND DESIGNED THE FIRST HELICOPTER. OVER 440 YEARS AGO.

News of the Industry

PAGE 705

VOLUME 62

Philadelphia, Saturday, May 3, 1930

NUMBER 18

Ford Production Due for Increase

Announcement of Revised Discount Scale and Reopening of Abandoned Assembly Plants Heralds Determined Effort to Dominate Low-Priced Market

Favors Urban Dealers

DETROIT, May 1—With the announcement that discounts allowed by the Ford Motor Co. to its dealers have been revised upward on a sliding scale from the present minimum of 17½ per cent, and the reported reopening of at least three assembly plants which have been inactive over a period of years, a renewed assault on dominance of the lower priced car market by Ford is foreseen by observers close to the industry. Present production of all Ford domestic units is hovering close to the 9000 mark daily. With the opening of a new plant at Long Beach Harbor, Calif., operating on a schedule of 350 cars daily, and refurbishing of plants at Louisville, Philadelphia, and Cambridge, Mass., a domestic production schedule in the neighborhood of 11,000 daily is an imminent possibility.

DETROIT, April 30—The increase in discount allowed Ford dealers effective April 26 from the fixed rate of 17½ per cent which had been in effect since the Ford list prices were reduced Nov. 1, 1929, to the sliding scale ranging from 17½ per cent on sales up to the first fifty sales to 21 per cent on sales in excess of 500 cars per year, makes it obvious that the Ford Motor Co. has provided its dealer family with a decided stimulant, particularly in the case of the large metropolitan dealer.

To just what extent this will enlarge Ford's status as a force to be reckoned with by the rest of the industry remains to be seen, of course, but general evidence at hand seems to indicate that he is on the verge of one of the greatest merchandising efforts in his history. In some quarters it is considered possible that the new higher discounts may reflect recently increasing dissatisfaction among Ford dealers over the discount cut of last November and since May, (Continued on page 708)

Coming Over



Maurice P. Berger

Director of the International Bureau for Automobile Standardization, who will be among the party of 30 French automotive engineers arriving in this country about May 20, under S.A.E. auspices

Vaughan Succeeds Lawrance

NEW YORK, April 30—Guy W. Vaughan, former vice-president and general manager of Wright Aeronautical Corp., has been elected president of that company, succeeding Charles L. Lawrance. Mr. Lawrance has relinquished this position to devote more time to his duties as chairman of the technical research committee of the Curtiss-Wright Corp.

Peerless Profit Increases

CLEVELAND, May 1—Peerless Motor Car Co. reports for the first 1930 quarter net profit of \$93,485, against \$23,933 in the first quarter of last year. Net profit for the six months ended March 31, 1930, was \$145,498, compared with a net loss of \$315,834 in the same period last year.

Michigan Sales Decrease During First Quarter

DETROIT, April 23—New passenger car registrations in the state of Michigan in March totaled 17,719, which is a gain of 5977 cars or almost 50 per cent over the total of 11,742 cars registered in the state in February. The March figure, however, shows a loss of 13,019 cars or more than 42 per cent as compared with the figure of 30,738 for March, 1929.

Total passenger car registrations in Michigan for the first quarter this year were 39,374 or a decrease of more than 33 per cent from the total of 59,598 in the same period last year.

Studebaker Reports Profit

SOUTH BEND, May 1—The net profits, after taxes, of the Studebaker Corp. and subsidiary companies for the quarter ended March 31, 1930, were \$1,492,137. After deducting preferred dividends and minority stockholders' interest the balance was equal to 62 cents per share on 1,961,413 shares of the outstanding common stock, as compared with 5,033,589, or \$2.57, after the same deductions, on 1,893,750 shares of common stock in the first quarter of last year.

Last year's earnings were the largest of any first quarter excepting one.

Sales were 19,465 cars this year, as against 32,007 cars in the first quarter of 1929.

Ford Reopening Cambridge Plant

BOSTON, April 29—The Ford Motor Co. has put some men to work renovating the old plant at Cambridge preparatory to reopening it for the assembling of cars. It is said that 1500 men will be put to work there shortly. This plant was shut down a few years ago when the Ford Motor Co. moved to its new assembling plant at Somerville.

Reo Reports Loss

DETROIT, April 28—Reo Motor Car Co. and subsidiaries report for the quarter ended Mar. 31, a net loss of \$175,437 after depreciation etc. This compares with a net profit of \$537,514 in the first quarter of 1929.

Competitive Steel Prices Feature Detroit Market

Demand for Full Finished Sheets
Continues Good

NEW YORK, May 1—The steel market is running true to the "good average year" form. This characterization by President Farrell of the Steel Corporation is being borne out all along the line. Operating schedules are being raised and lowered with considerable frequency, and backlogs run very light. Shenango Valley mills, following a pronounced slack during the first quarter, report the best rate of operations in six months. On the other hand, Chicago District and Buffalo mills, which fared better in March and April than did the general run of eastern Ohio and western Pennsylvania plants, have moved their operating rates downward.

Competition is keenest in the Detroit market. Demand for all finished automobile sheets continues fairly good. Prices on special finishes of black sheets are highly competitive. The 2.65-cent, Pittsburgh, quotation is generally maintained on common black sheets, but when extras are involved for finishes, concessions in the base price are not infrequent.

The market for blue annealed sheets presents the anomaly of those gage sizes that compete with the product of light plate mills being weak, while the lighter gage sizes are quite steady. Strip steel demand is light, with that for the cold-rolled being subnormally so.

Manufacturing wire remains unchanged at 2.40-cent base, with fair demand from automotive consumers, downward revision of staples and barbed wire not having affected wire for manufacturing use. Pressure by non-integrated rollers on semi-finished steel prices has so far not led to any reduction in quotations for sheet bars, billets, etc., although in some cases concessions are believed to have been made.

Pig Iron—The movement of pig iron to automotive foundries is of a routine character. Prices are unchanged and the market's tone is steady.

Aluminum—Prices for virgin aluminum are unchanged. The market for remelt metal is irregular. Prices paid for scrap by remelters have eased off further.

Copper—Considerable hesitancy on the part of domestic consumers continues as a brake on activity. The Wall Street ticker carried the following on Monday: "So far as can be learned at this time producers will test out present price level (14 cents) thoroughly. Whether buying comes in volume at this level will depend largely upon trend of general industry here and abroad. If they decide to do so, producers can hold indefinitely at present level. Price was held at 18 cents for a year."

Tin—Heavy selling pressure, both in London and here, caused the market to dip below 35 cents for prompt Straits tin at the opening of the week.

Lead—Quiet, easy, and quotably unchanged.

Zinc—Dull. Prompt shipment quoted at as low as 4.70 cents, East St. Louis.

"Silver Bullet" Shipped to England

NEW YORK, April 30—Kaye Don's racing car, the Silver Bullet, will be sent back to England on the Mauretania leaving today, after several unsuccessful attempts to break the world's speed record at Daytona Beach.

Financial Notes

Michigan Steel Corp., manufacturer of sheet steel, has reported a net profit for the first quarter of 1930, after all charges including depreciation and Federal taxes, amounting to \$322,281 or \$1.46 a share on the 220,000 shares of common stock outstanding. This compares with \$587,333 or \$2.67 on the same capitalization for the same period a year ago.

Yellow Truck & Coach Mfg. Co. has reported a net profit of \$105,844 after provision for depreciation, for the quarter ended March 31, 1930. This is equivalent to 70 cents a share on 150,000 shares of seven per cent preferred stock, on which there is an accumulation of unpaid dividends, and compares with 39 cents a share on the preferred in the first quarter of 1929.

Motor Products Corp. for the first quarter of 1930, announced gross operating profits amounting to \$474,709 and net profit of \$232,019, equal to \$1.16 a share on 197,366 outstanding common shares.

Van Sicken Corp. annual report for the year ended Dec. 31, 1929, revealed a consolidated net income of \$183,301, after all charges and Federal taxes. No adequate comparison can be made with the operations of the preceding year because of acquisitions and changes in structure.

Standard Motor Construction Co., builder of Diesel engines for marine and industrial uses, reports an increase of 48 per cent in sales for the year 1929. The company showed a profit of \$49,905 for the same period. This is stated to be the first profit reported since the company changed its whole production scheme to the exclusive manufacture of Diesel engines.

Martin-Parry Corporation, York, reports a new loss of \$120,653, after interest and charges, for the second quarter of the fiscal year. Net sales of the corporation amounted to \$473,347 in the period.

Clark Equipment Co. for the year ended Dec. 31 reports net income of \$1,309,514, after all charges, equal after preferred dividends to \$4.92 a share on 249,824 shares outstanding Dec. 31. Consolidated net income of present constituent companies in 1928 totaled \$1,588,654.

Libbey-Owens Sheet Glass Co., large maker of glass for automotive uses, reported net profit of \$716,773 for first quarter 1930 after all charges and Federal taxes. This was nearly 40 per cent gain in profits over the last quarter of 1929.

United Engineering and Foundry Co. declared yesterday an extra dividend of 35 cents.

N.S.P.A. Adds Members

DETROIT, April 25—E. P. Chalfant, executive vice-president of the National Standard Parts Association, announces the recent election of 20 new members, including 11 jobbers and 9 manufacturers. The names of the new manufacturing member concerns follow: Anderson Co., Gary, Ind.; Carborundum Co., Niagara Falls, N. Y.; General Electric Co., Schenectady, N. Y.; Imperial Brass Mfg. Co., Chicago, Ill.; Lyon Metal Products, Inc., Aurora, Ill.; C. E. Niehoff & Co., Chicago, Ill.; The Ochrome Products Co., Inc., N. Y. City; Stevens-Walden, Inc., Worcester, Mass.; Joseph Weidenhoff Co., Chicago, Ill.

York-Hoover Adding Plant

YORK, PA., April 30—Ground has been broken for the erection of an addition to the York-Hoover Body Corporation, at a cost of approximately \$40,000. The structure will connect the present plant with the building of the York Knitting Mills Co., recently acquired by the corporation.

Marmon Earns \$936,250 for Year Ending February

Rate at \$2.93 a Share Following
Deductions

INDIANAPOLIS, April 28—Marmon Motor Car Co. reports net earnings for the fiscal year ended Feb. 28, 1930, of \$936,250.61 after depreciation and all other charges except Federal income tax of \$1,670,274.59.

After provision for Federal income tax amounting to \$103,361.40 and preferred stock dividends of \$70,000, the earnings are equivalent to \$2.93 per share on the 260,000 shares of outstanding common stock.

In a statement to stockholders, coincident with the issuance of the yearly report, G. M. Williams, Marmon president, explained that the abnormal expenses written off in the year included non-recurring selling expenses and allowances incidental to the severe business depression last fall and also included extraordinary advertising costs necessary to introduce and exploit the new Marmon built Roosevelt car in the \$1,000 price field.

Mr. Williams pointed out further that the operations for the last quarter, including end of the year adjustments, showed net earnings before Federal taxes amounting to \$119,384.98, which indicates a favorable trend in Marmon operations.

Tractor Entries Received

PHILADELPHIA, April 30—It is reported that numerous entries have been received already for the farm tractor competition, which is to be held in England in September next. Most of the European entries appear to be equipped with Diesel engines. Thus in Class Three there are entries by the British firms of MacLaren and Fowler, both with Diesel engines, the Fowler having an engine of 100 hp. In Class Four there are Diesel engined entries by A. E. G., MacLaren, Daimler-Benz and Austin. Among American tractor makes that will be represented are Caterpillar, Fordson, Case, International and Massey-Harris. The trials will take place near Wallingford.

Willys Sells Toledo Home

TOLEDO, April 28—John N. Willys, chairman of the board of Willys-Overland Co., and ambassador to Poland, has sold his Ottawa Hills home here to Marshall Sheppey, president of the Berdan Co., wholesale grocers. The residence was built four years ago at a cost of \$250,000. Sheppey is a director of the Harriman National Bank, New York, a leader in local Republican politics, and friend of Willys.

Stinson May Increase Schedule

DETROIT, April 28—With unfilled orders for 75 planes on hand April 1, a maximum production for 1930 of 200 planes more than was planned originally by the Stinson Aircraft Corp., subsidiary of the Cord Corp., may be necessary, according to Wm. A. Mara, vice-president, yesterday.

Biggers Heads Merger of Libbey-Owens-Ford

United Companies Are Largest Car
Glass Producers

TOLEDO, April 28—John D. Biggers, for many years identified with the glass industry and more recently general manager of factory branches for Graham-Paige Motors Co., and vice-president and general manager of the Graham-Paige International Corp., has been named president of the new Libbey-Owens-Ford Glass Co., which will merge the properties of the Edward Ford Plate Glass Co., and Libbey-Owens Glass Co., with headquarters at Toledo.

Mr. Biggers will give up his active duties with Graham-Paige to take over the reins of the Libbey-Owens-Ford consolidation. This unit is now the largest automobile glass producing company in the world and one of the largest producers of plate glass of all sizes.

James C. Blair, former president of the Libbey-Owens company, becomes chairman of the board succeeding Ray A. Graham, who asked to be relieved of the special duties incident to this office, but who plans to retain a close and active interest in management of the company.

Other officers of the company include B. C. Root, executive vice-president; Charles A. Schmettau, vice-president; H. H. Baker, vice-president and secretary; George P. MacNichol, Jr., vice-president in charge of sales; David Goodwillie, vice-president in charge of engineering; H. E. Allen, vice-president, and R. H. Taylor, treasurer.

McAleer Has Good Quarter

DETROIT, April 28—The McAleer Mfg. Co. of Detroit, which supplies car manufacturers with polishing products, enjoyed during the first quarter of 1930 a volume of business equal to 60 per cent of the entire output for 1929, according to C. H. McAleer, president of the company.

The McAleer Mfg. Co. will place two new products on the market by May 10, it was stated.

Mercedes-Benz Appoints Agent

NEW YORK, April 29—Mercedes-Benz Co., Inc., has appointed the National Railway Appliance Co. as representatives handling the Diesel engines, together with buses and trucks equipped with Diesel motors. These products will be displayed at the American Railway Association Convention to be held in June at Atlantic City, N. J.

Day-Elder Improves Models

IRVINGTON, N. J., April 30—A number of improvements in design are now effective in the 1½-ton Model MF Day-Elder truck, manufactured by the National Motors Mfg. Co. These changes are made without increase in price, and include a new and sturdier tapered frame, helper springs and longer wheelbases.

General Electric Prices Reduced
SCHENECTADY, April 30—General Electric Company has announced, effective immediately, price reductions of from 3 per cent to 5 per cent covering various standard lines of electric apparatus. These reductions were made as a reflection of the recent recession in the price of copper.

N.A.C.C. Warns Against Unfounded Rebate Claims

NEW YORK, April 29—Ill-founded appeals for rebate on freight rates, entered into by automobile dealers at the solicitation of commercial freight bureaus, are building up a series of refusals by the Interstate Commerce Commission which will constitute a deleterious precedent in case a well-founded case should come up, in the opinion of the National Automobile Chamber of Commerce. This body has sent a letter to its members urging them to impress upon their dealers the importance of querying the factory when they are approached by these freight bureaus and finding out the merits and probable outcome of the suggested claims.

These freight bureaus approach dealers suggesting that they are paying too much freight for cars shipped them from the factories and offering to file an appeal with the I. C. C. They point to the possibility of securing rebates for rates paid over the past two or three years and offer to take over the case for 50 per cent of the rebate secured.

Thompson Get Large Release

CLEVELAND, April 30—Orders to release 430,000 valves for the Chrysler Motor Corp., applying on a blanket contract, were received today by Thompson Products, Inc., according to C. E. Thompson, president. Shipments will start in the next few days from the Cleveland plant and will cover Chrysler production during May. The Thompson Detroit plant is operating at maximum capacity, and the Cleveland plant at 80 per cent.

Houdaille-Hershey Earns \$80,365 for Quarter

Considerably Below Expectation,
Says Barnes

CHICAGO, April 28—Net earnings of Houdaille-Hershey Corp. for the first quarter of 1930, after all charges, including depreciation, provision for Federal taxes and unusual expenses incurred in moving the company's plant, amounted to \$80,365. This compares with net of \$552,873 for the first quarter of 1929.

Claire L. Barnes, president, stated that this figure was considerably below earlier expectations, due to postponement of releases, caused by drastic curtailment of automobile production during the first two and one-half months.

"A marked improvement set in about the middle of March," he added, "as evidenced by the fact that net earnings for March were greater than those for the entire first quarter. The month of April has already shown a decided improvement over March and there is every indication that the second quarter will be very satisfactory.

"Voluntary curtailment on the part of most automobile manufacturers during recent months has laid a firm foundation for favorable future business."

Credit Survey Ready May 15

WASHINGTON, April 28—Part II of the National Retail Credit Survey which will cover automobiles and automobile accessories will be issued about May 15, according to present plans of the Domestic Commerce Division, Department of Commerce, which recently issued Part I. The study was undertaken by the Department at the suggestion of the National Retail Credit Association and was nation-wide. It is being issued in three parts, and covers the years 1925, 1926 and 1927. Beginning July 1, the Division will collect information on a current basis and will issue the retail credit data semi-annually.

Rubber Invoiced to U. S.

WASHINGTON, April 29—American consular offices at Singapore, Penang, Colombo, Batavia, Surabaya, Medan, London and Liverpool, whose vise invoices on all rubber shipped to the United States from Malaya, Ceylon, Netherland East Indies, and the United Kingdom, report by cable the following amounts or rubber invoiced during the week ended April 26, as compared to amounts invoiced in 10 preceding weeks:

1930	Week Ended	British Malaya	Ceylon	Netherland East Indies	London and Liverpool	TOTAL
Feb. 15	7,223	1,312	1,315	59	9,909
Feb. 22	7,010	1,223	2,389	51	10,673
March 1	8,146	2,315	2,898	57	13,416
March 8	6,637	925	1,990	45	9,597
March 15	6,256	658	1,786	10	8,710
March 22	7,075	753	1,997	19	9,844
March 29	5,867	1,335	1,462	Nil	8,664
April 5	7,435	779	2,109	Nil	10,323
April 12	7,026	1,235	1,527	7	9,795
April 19	6,013	493	1,109	21	7,636
April 26	5,558	642	1,224	Nil	7,424

All figures in long tons.

Ford Production Expected to Register Increase

Dealer Discounts Revised Upward

(Continued from first page)

1927, steadily decreasing number of Ford dealers. The new discount rates are as follows:

- 17½ per cent on sales up to 50 cars.
- 18 per cent on sales from 51 to 100 cars.
- 19 per cent on sales from 101 to 150 cars.
- 20 per cent on sales from 151 to 500 cars.
- 21 per cent for quantities in excess of 500 cars.

Ford dealer contracts are renewed the first of each year. While the increased discount rates are effective only since April 26, credit is applied to the sliding scale system from sales made since Jan. 1. For instance, dealers having sold 50 cars since the first of the year are now getting at least 18 per cent discount. In other words, the dealer has not been obliged to build up his initial sales of 50 cars since April 26 to become entitled to the next discount rate and by this token a number of larger Ford dealers having sold 500 units this year are now getting 21 per cent on cars ordered as of April 26 and after. Taking for calculation purposes, the average list price of a Ford unit as \$550, the following table is arranged to show what the increased discount rates may mean to the dealer:

Yearly Sales	Dealer's Discount at 17½%	Dealer's Discount at New Sliding Scale Rate	Increase in Dealer's Annual Discount
2000 units or \$1,100,000	\$192,500.00	\$226,737.50	\$34,237.50
1500 units or \$825,000	144,375.00	168,987.50	24,612.50
1000 units or \$550,000	96,250.00	111,237.50	14,987.50
500 units or \$275,000	48,125.00	53,487.50	5,362.50
150 units or \$82,500	14,437.50	14,987.50	550.00
100 units or \$55,000	6,625.00	9,762.50	137.50

From the above table it will be seen that the advantage gained by the dealer from the new discount rates varies from \$34,237.50 on sales of 2000 units down to \$137.50 on sales of 100 units. The average gain per dealer should be somewhere in the neighborhood of \$800 annually. It follows that the new discount rates offer the greater advantage by far to the large metropolitan dealer who in turn may feel that this is fitting in view of the smaller overhead of the small community dealer and the open territory sales policy of the manufacturing company.

Hudson Has Profit

DETROIT, April 28—Hudson Motor Car Co. has reported for the first quarter of the year earnings of \$2,316,945 on 1,596,660 shares of stock. This is at the rate of \$1.45 a share and amply covers dividend requirements for the period.

Austin Gets Kentucky Outlet
LOUISVILLE, KY., April 29—Articles of incorporation have been filed at Lexington, Ky., by the Lexington Austin Co., capital \$4,000; T. C. Geary, Tom F. Gay and Burt V. Halbert, incorporators. It is the first recognized Austin organization to be formed in Kentucky.

Accident Fatalities Gain

WASHINGTON, April 29—The number of deaths from automobile accidents in 78 large cities of the United States was 605 during the four weeks ending April 19, 1930, compared with 526 during the four weeks ending April 20, 1929.

For the 52 weeks ending April 19, 1930, the total number of such deaths was 8675, compared with 7657 for the 52 weeks ending April 20, 1929, giving a recent death rate of 26.4 per 100,000 population, as against an earlier rate of 23.3, or an increase of 13 per cent in the rate in a single year.

Chrysler Moves Offices

NEW YORK, April 30—Walter P. Chrysler has moved his New York offices into the Chrysler Building, at present the tallest building in the world. This building, on the corner of Lexington Ave. and Forty-Second St., has just been completed.

Plimpton Joins White Co.

CLEVELAND, May 1—R. E. Plimpton, former associate editor of *Bus Transportation*, has joined the sales promotion staff of the White Co.

General Motors Directors Remain
WILMINGTON, DEL., April 30—At the annual meeting of stockholders of the General Motors Corp. held here today, all the present directors of the corporation were reelected for the ensuing year.

G.M. Declares Dividends

NEW YORK, May 1—Directors of the General Motors Corp. meeting here today declared the regular quarterly dividend of 75 cents a share on common stock, payable June 12 to stockholders of record May 10. The regular dividend on senior securities, payable Aug. 1 to holders of record July 7, was also declared. Recommendation was made that a special stockholders' meeting be called for May 25 for the purpose of authorizing the issuance of 6,000,000 shares of 5 per cent preferred stock, for the retiring of existing senior securities.

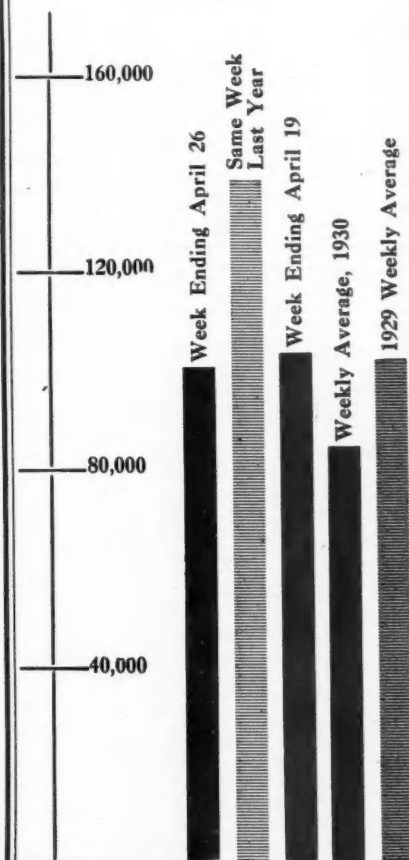
N.A.C.C. Receives Award for Meritorious Service

Presentation Made at U. S. Chamber Meeting

WASHINGTON, May 1—The National Automobile Chamber of Commerce was unanimously awarded the trophy of the American Association of Trade Association Executives at the annual meeting of the Chamber of Commerce of the United States here last night. In making the award, which is in the form of a plaque, Secretary of Commerce Lamont, who headed the committee making the selection said:

"This award was made for original and outstanding service to the public. It marks a step in advance of most associational work, and is of dominant importance because of the magnitude of the automobile industry, and the strength of the association representing it. By unanimous vote the jury cited it as a representative accomplishment."

Automotive Industries
Production Chart
Weekly



The composite chart appearing above will delineate each week production of passenger cars in the United States and Canada, for the week preceding publication of the issue in which it appears, together with production for the preceding week, and other factors. Data used in compiling it are obtained in confidence from a number of sources. Other factors may be added, dependent upon the cooperation of additional sources of information.

March Parts Business Shows Improved Tone

Original Equipment Index
Stands at 167

NEW YORK, April 23—March business in parts and equipment for the automotive industry showed a marked improvement over February, although still falling somewhat behind a year ago, according to the monthly index figures of the Motor and Equipment Association. Original equipment index for the month of March was 167, based on January, 1925, as 100, and compares with 141 for February and with 275 for March of last year. This seems to portend an increased car production for April as compared with March, but car production will still obviously be much below last year's record.

Service parts index for the month was 135 as compared with 131 in February and with 148 in March, 1929. Accessories continue in rather poor demand with the March index at 67 as compared with 66 for the previous month and with 85 for the corresponding month of last year. Service equipment index was 175 as compared with 151 for February and 224 for March of last year. The grand index thus becomes 155 for the industry for the month as compared with 138 for February and with 241 for March, 1929.

Wholesalers throughout the country showed a marked improvement during the month, their sales mounting considerably above the previous month, although still falling below March of last year. The happiest omen, as far as the wholesalers are concerned, however, is that accounts receivable declined in the face of advanced sales.

Automotive Brevities

Wheels, Inc., 835 Eleventh Ave., New York City, N. Y., representing several of the principal Motor Car Wheel Manufacturers in the Eastern Territory, has just completed arrangements with Loomis-Root, Inc., Buffalo, N. Y., to represent them in the East.

Lincoln Electric Co., Cleveland, announced the opening of new offices in Saginaw, Mich.; Fort Wayne, Ind., and Oil City, Pa.

Kelsey-Hayes Wheel Corp. has declared regular quarterly dividend of \$1.75 on preferred, payable May 1 to stockholders of record April 21.

Black & Bigelow, Inc., airport engineers, has just celebrated 10 years of business as consulting engineers in its field.

Young Radiator Co., Racine, Wis., reports a very satisfactory gain for the first three months of 1930 over the same period of 1929. Additional equipment has been added to the stamping department.

Hill Machine & Foundry Co., Cleveland, announces that it has reopened its New York office. A. L. Whiteside is the engineer in charge.

DeWalt Products Corp., Lancaster, Pa., has acquired a Wodack electric hand saw and the Wodack electric combination mortiser and router. The products will be manufactured in the DeWalt plant at Lancaster.

Thomas Products, Inc., Cleveland, reports that tie-rod production during 1929 increased 50 per cent over the year previous.

Thompson now makes tie-rods for 105 automotive manufacturers, according to the announcement.

DeVilbiss Co., Toledo, Ohio, is expanding its overseas business. Several of its American executives are now in Europe working with executives in charge of the London and Paris factories and sales offices of the company.

Charles A. Palmgren, Sr., president of the Chicago Tool & Engineering Co., Chicago, has patented a new stabling device which will possibly find a place in the upholstery department of automobile factories. The device is in the form of an air gun hammer, releasing staples from a magazine at the touch of a trigger.

Hersam & Sherwood, Inc., Philadelphia, has just been organized to replace the Progressive Engineering & Tool Co., consulting, designing and industrial engineers. Conrad O. Hersam is president of the new company after 4½ years of service to the previous organization.

C. J. Tagliabue Mfg. Co., Brooklyn, N. Y., instrument maker, has announced acquisition of a property on Park Ave., Brooklyn, to which it will move from the Bush Terminal.

American Cyanamid Co., New York, standard organization of the American Powder Co., has become exclusive sales agents for all grades of manufactured by the latter.

American Chemical Paint Co. has purchased a patent on the dry-cleaning system for bodies owned by the Rex Products Co., Detroit.

National Cord Products Co. has moved its plant to 1379 E. Milwaukee Ave., Detroit, Mich.

Eaton Bumper & Spring Service Co., Cleveland, is manufacturing arrangement with Tropic-Aire, Inc., a Perfection hot water heater.

Gigs Mfg. Co., Chicago, has issued a new catalog of Gigs precision oil retainers for power transmission uses.

Foot Bros. Gear & Machine Co., Chicago, announces the appointment of Sutor & Co., 2008 E. Slauson Ave., Los Angeles, Calif., as distributor for its speed reducers and gear products.

Melbourne Motor Body & Assembly Co., Pty. Ltd., has changed its name to Ruskins Motor Body Pty. Ltd. The company is located in West Melbourne. The company is one of the oldest Australian body builders.

Curtiss-Wright Corp. has begun the publication of a new house organ, called the Curtiss-Wright Trade Wind. Vol. 1, number 1, appears as of April, 1930.

Indiana Pressed Steel Co., Muncy, Ind., has announced the appointment of the Theo. L. Dodd & Co., 80 E. Jackson Blvd., Chicago, as western sales representatives.

Carter Carburetor Corp. has appointed Mid-States Auto Electric Co., Chicago, as central distributor.

Surface Combustion Co., Toledo, announces that the Pittsburgh branch of the company and the office of the Mantle Recuperator Division will be consolidated and will occupy new offices at 617-619 Henry W. Oliver Bldg.

Clark Reports Income

CHICAGO, April 29—The Clark Equipment Company and subsidiaries for the first quarter of 1930 report a net income of \$275,854, after all charges including Federal taxes. This is equivalent after preferred dividends to \$1.02 a share on 249,838 shares outstanding. All of the Frost Gear and Forge Company eight per cent preferred stock was retired during the quarter, leaving as the sole minority interest outstanding \$4,942, which represents the unexchanged common stock of the Frost Gear Company.

Borg-Warner Quarter Net Reaches \$1,097,811

Equivalent to 84 Cents a Share
on Common Stock

CHICAGO, April 28—Borg-Warner Corp. reports net income, after all charges, including depreciation and taxes, for the first quarter of 1930 totaling \$1,097,811, equal, after preferred dividend requirements, to 84 cents a share on 1,230,686 shares of common stock outstanding.

The balance sheet on March 31 showed cash of \$3,123,886 and call loans and marketable securities of \$4,419,455, a total of \$7,543,441, substantially in excess of current liabilities. Total current liabilities, including provisions for taxes and April 1 dividend requirements, were \$5,530,771 and total current assets amounted to \$19,919,468.

Sales and earnings have shown increases in each month of 1930 over the preceding month, and officials of the company estimate that, on the basis of orders on hand, both sales and profits should show a substantial increase in the second quarter and satisfactory results over the first six months of the current year.

Moon Producing Windsor

ST. LOUIS, May 1—The new officers of the Moon Motor Car Co. have placed the plant on a production schedule of 12 Windsor cars a day since taking charge of the company 10 days ago.

William J. Muller, new president, declared the present management intends placing the affairs of the company on an aggressive and satisfactory basis. The production of Windsor cars will be increased, and Muller believes the business will expand rapidly when production of the Ruxton is started.

A court fight has been threatened by old officers of the Moon Co., who were ousted by a vote of stockholders. The old officers, who include C. W. Burst, former president, and Stanley Moon, member of the family which started the concern, do not recognize the validity of the stockholders' action.

Heinen Forms Company

NEW YORK, April 28—Captain Anton F. Heinen, Toms River, N. J., and associates have organized Heinen Air Yacht Corp. with capital of 1000 shares of stock, no par value, to establish an aircraft manufacturing plant on property recently leased from City Commission at Atlantic City, N. J., specializing in production of large type multi-passenger airplanes, with parts and assembling departments. The same interests have also formed Heinen Airport, Inc., with capital of 100 shares of stock, no par value, to construct airport on adjoining site, with hangars, repair shops and other units. Work will begin at once. Louis Matzhold and Henry W. McAlees, both of Toms River, are interested in new companies.

Men of the Industry and What They Are Doing

Plymouth Appoints Three

L. G. Peed, general sales manager of the DeSoto Motor Corp., has announced the following appointments: H. M. Rowell, Plymouth manager in Philadelphia, has been appointed district manager of the Washington territory. He succeeds Willard Karl. With him in the Washington organization will be George W. Sandbridge, former De Soto district manager in Charlotte, N. C.

R. W. Watson, formerly sales representative in the Washington district under Mr. Karl succeeds Mr. Sandridge in Charlotte. J. D. Costlow has been appointed district manager of the Buffalo territory, succeeding A. W. Burg. Mr. Costlow was also a former Plymouth man.

White Names Russell

Vice-President Saunders Jones has announced the appointment of George F. Russell to the position of sales manager of the White Co., Cleveland, manufacturers of motor trucks and buses. Russell's headquarters will be maintained at the company's home office in Cleveland and for the present he will continue as vice-president of the Central Region.



George F. Russell

Mr. Russell came to the White Co. in 1914 as assistant manager of the then western sales department. Since that time he has served successively as manager of the southeastern district; assistant general manager, under the late President Walter C. White; as vice-president in charge of sales and as vice-president of the three sales regions which were consolidated into the Central Region.

Chrysler Engineers Elect

Chrysler Engineers' Club elected the following officers for the year at their annual meeting held in the Engineering Building, Highland Park, last week: H. T. Woolson, chief engineer all divisions, president, succeeding Allan B. Couture; George B. Allen, director of engineering, Dodge division, vice-president succeeding C. E. Davy; H. C. Kelly, standards engineer, secretary-treasurer, succeeding W. H. MacDuff; G. W. Hubbard, chief draftsman, Highland Park, member-at-large, succeeding H. E. Maynard.

Martin-Parry Shifts Three

Recent changes in personnel of the Martin-Parry Corporation, York, Pa.;



Fred L. Rockelman

Whose appointment to the personal staff of Walter P. Chrysler was announced in Automotive Industries last week.

H. J. McDevitt took charge of the Boston branch, being succeeded at Buffalo branch by Arthur William Craul, of York, Pa. A. J. Clayton has taken charge of both sales and branch operations in Memphis, Tenn., after transfer from St. Louis.

Phelps Goes to England

George Harrison Phelps, head of the Detroit advertising firm bearing his name, who has been appointed a special commissioner of the U. S. Department of Labor to investigate European wage systems, as announced by Secretary James J. Davis, sailed last week for England to begin his tour which will include industrial centers in Great Britain, France, Germany, Austria, Italy, Spain, Belgium and the Scandinavian countries. He will make a special survey of the extent to which European manufacturers have adopted American production methods.

Toledo Doubles Registrations

TOLEDO, April 28—With registrations of 105,000 motor vehicles in 1929, this city has doubled its automotive population in six years, according to official figures announced by state authorities. Lucas County, in which Toledo is located, produced third largest amount of revenue from licenses last year.

Sikorsky Elects Dickinson

A. C. Dickinson, president of Sikorsky Aviation Corp., has been elected chairman of the board of that company, succeeding F. B. Rentschler, president of United Aircraft & Transport, Inc., who has had to relinquish that post on account of the press of his other duties. Mr. Dickinson is succeeded by E. E. Wilson, president of Hamilton Standard Propeller Corp., another subsidiary of United. Mr. Wilson retains his position with Hamilton as well as carrying on his new duties as president of Sikorsky.

Heinrichs Gets Appointment

The appointment of R. M. Heinrichs as general manager of the newly formed Bendix-Westinghouse Automotive Air Brake Co. has been announced, following a recent meeting of the board of directors at Wilmerding. Mr. Heinrichs comes to Pittsburgh and the new brake company with a broad experience in the automotive field, having formerly served the Bendix Corp. as assistant to the vice-president in charge of sales.



R. M. Heinrichs

Getz Joins Agency

Carl Getz, for the past two years supervisor of publicity for the export division of General Motors Corp., has resigned to become associated with the J. J. Walter Thompson Co., who handle the overseas advertising of General Motors. Mr. Getz has just returned from a seven months' trip throughout the Orient, where he visited the Far Eastern operations of General Motors. Prior to his association with General Motors Mr. Getz spent five years with McManus, Inc., advertising agents.

Goodyear Appoints Snow

Welton A. Snow, former city manager at Miami, Florida, has been appointed assistant resident manager of the 37,000-acre cotton plantation of the Goodyear Tire & Rubber Co. near Phoenix, Ariz., according to an announcement by officials of the company.

Mack Appoints Bern

Edward G. Bern has been appointed branch manager of the Mack-International Motor Truck Corp. He was transferred from the Minneapolis branch Nov. 1, to the new territory.

Exports, Imports and Reimports of the Automotive Industry for March of Current Year, and Total for Three Months Ended March, 1930

	1929		1930		1929		1930	
	Number	Value	Number	Value	Number	Value	Number	Value
EXPORTS								
Automobiles, parts and accessories .....	..	\$75,759,013	..	\$37,569,005	..	\$181,156,497	..	\$97,451,498
Electric trucks and passenger cars	3	4,530	10	14,287	12	16,520	17	26,914
Motor trucks and buses except electric (total)	24,883	13,625,014	8,961	6,310,616	57,721	32,739,443	28,587	18,605,271
Up to 1 ton, inclusive	18,954	7,911,041	2,994	1,851,908	44,223	18,718,209	15,085	7,631,372
Over 1 and up to 2 1/2 tons	5,520	4,629,165	5,415	3,377,248	12,530	11,454,190	12,334	8,567,424
Over 2 1/2 tons	404	1,084,808	552	1,081,460	963	2,567,044	1,168	2,406,475
PASSENGER CARS								
Passenger cars except electric (total)	51,504	35,021,773	22,129	15,617,770	109,355	76,736,084	56,154	39,763,054
Low price range \$1,000, inclusive	38,915	19,842,544	15,577	8,013,865	80,428	41,244,397	39,770	20,348,024
Medium price range, \$1,000 up to \$2,000... ..	11,140	11,810,487	5,900	6,093,282	25,580	27,652,146	14,559	15,159,233
High price range, over \$2,000	1,449	3,368,742	652	1,510,623	3,347	7,839,541	1,825	4,255,797
PARTS, ETC.								
Parts, except engines and tires .....	..	..	..	..	..	..	..	..
Automobile unit assemblies .....	..	16,227,348	..	8,661,449	..	40,009,358	..	21,623,241
Automobile parts for replacement (n.e.s.) .....	..	7,642,452	..	4,701,427	..	24,445,728	..	12,672,444
Automobile accessories .....	..	1,242,789	..	673,545	..	3,037,436	..	1,760,436
Automobile service appliances (n.e.s.) .....	..	683,492	..	642,846	..	1,777,600	..	1,884,193
Trailers	112	48,577	104	71,448	268	128,418	234	188,114
Airplanes, seaplanes and other aircraft	38	686,655	27	425,688	69	1,103,520	56	885,702
Parts of airplanes, except engines and tires ..	..	322,091	..	186,922	..	484,945	..	526,674
BICYCLES, ETC.								
Bicycles	712	17,824	216	6,150	1,708	43,851	776	22,482
Motorcycles	2,300	531,844	1,832	370,964	5,527	1,273,562	4,568	1,014,610
Parts and accessories, except tires .....	..	116,323	..	97,082	..	329,392	..	327,763
INTERNAL COMBUSTION ENGINES								
Stationary and Portable:								
Diesel and Semi-Diesel	47	86,703	39	86,963	294	262,944	100	248,551
Other stationary and portable:								
Not over 10 hp.	3,816	360,544	2,523	205,713	9,577	865,164	7,626	604,650
Over 10 hp.	343	185,325	739	369,665	1,045	548,513	1,242	665,125
Automobile engines for:								
Motor trucks and buses	2,295	293,650	10,007	767,947	4,895	605,606	13,916	1,101,952
Passenger cars	16,116	1,626,087	8,865	752,978	32,637	3,410,623	18,945	1,680,595
Tractors	135	19,572	12	5,272	310	85,257	83	40,817
Aircraft	66	207,026	19	98,958	122	484,923	57	255,661
Accessories and parts (carburetors) .....	..	472,943	..	328,887	..	1,146,747	..	1,024,919
IMPORTS								
Automobiles and chassis (dutiable)	29	89,134	43	100,226	114	261,882	120	203,538
Other vehicles and parts for them (dutiable) ..	..	128,750	..	14,341	..	338,534	..	53,761
REIMPORTS								
Automobiles (free from duty)	46	52,547	25	14,048	93	136,631	62	57,714

Master Tire Organized

AKRON, April 29—Master Tire & Rubber Corp., Akron, Ohio, has been organized with capital of \$2,000,000 and 135,000 shares of common stock, no par value, to take over and consolidate Falls Rubber Co., Akron, and Cooper Corp., Findlay, Ohio, both manufacturers of rubber products, including tires, tubes, etc. New company is considering acquisition of other companies in same line. Ira J. Cooper, head of Cooper Corp., is president, and Frank C. Millhoff, Akron, formerly connected with Miller Rubber Co., same city, is vice-president.

Edwin H. Lockwood

PHILADELPHIA, April 28—Edwin H. Lockwood, professor of mechanical engineering at Yale University, died at New Haven on April 16, at the age of 64. Professor Lockwood took much interest in automotive engineering and conducted and supervised much experimental work relating to different phases of automobile design. His experiments on losses in pneumatic tires and on coefficients of air resistance are particularly noteworthy.

Ceylon Registrations Lag

COLOMBO, CEYLON, March 24—For the first time after several years the monthly increase in the number of motor vehicles registered and in use in Ceylon has fallen, during February last, to the low figure of 63. How low this is may be judged from the fact that, while for the last twelve months the average monthly increase has been well over 250, even in the "leanest" month, which was April last, the increase was 175. In January last the

increase was 270, while in February, 1929, an increase of 256 was recorded. The phenomenal decrease last February is no doubt due to the slack state of the markets prevailing now.

Nuvolari Finishes First

PARIS, April 15—Driving a 1750 cc. six-cylinder Alfa Romeo, Nuvolari won the fourth annual Italian Thousand Miles race, before 134 starters, in 16 hrs. 18 min. 59 1/5 sec., or at an average speed of 62.41 m.p.h., thus improving on the best previous time by 1 hr. 45. min. Second place was taken by Varzi and Canavesi on Alfa Romeo; third position by Campari and Marinoni, also on Alfa Romeo, and fourth place by Gherzi and Cortese, on Alfa Romeo. An O.M. finished fifth, and the 7000 cc. six-cylinder supercharged Mercedes, driven by Caracciola and Christian Werner, came in sixth, one hour behind the winner.

Massachusetts May Require Safety Glass on Buses

BOSTON, April 28—The lower branch of the Massachusetts legislature passed by a substantial vote a measure that provides for all motor vehicles carrying passengers for hire to be equipped with shatter-proof glass all around beginning on January 1 next. The law now goes to the Senate where it will be debated next week.

Detroit Air Show Set Record

DETROIT, April 28—Attendance at the All-American Aircraft Show broke all previous records, according to Ray Cooper who managed the event for the Detroit Board of Commerce. Tickets purchased at the gate totaled 177,122, of which 129,008 were adults.

Outboard Reports Profit

CHICAGO, April 28—Outboard Motor Corp., which was formed last year through the consolidation of the Lockwood Motor Co., Evinrude Motor Co. and Elto Outboard Motor Co., reports net profits for the March quarter of 1930 of \$57,710, indicating benefits of the merger, as the first quarter normally is a dull period in the company's business. The earnings cover the quarterly dividend requirements and compare with a combined net deficit of \$40,995 reported by the three predecessor companies in the same quarter last year.

Shipments of motors in the first three months of the present year increased 30 per cent above the 1929 period, while orders received up to April 15 aggregated 25,000 units, comparing with sales during the last full year of 23,000 units.

W. H. Freet

CHAMBERSBURG, PA., April 29—W. H. Freet, assistant sales manager of the Chambersburg Engineering Co. died April 26, according to announcement from the company. Mr. Freet was born in 1881, and joined the company in 1900 as secretary to H. E. Derbyshire, president. He was made assistant purchasing agent in 1910, and assistant sales-manager in 1928.

C.I.T. Adds Eight Offices

NEW YORK, April 28—Eight new offices in various parts of the United States are being opened this month by subsidiaries of Commercial Investment Trust Corp., for the purpose of furnishing local finance service to dealers and manufacturers selling automobiles and other products.

Automotive Construction Easy During Last Week

Few Projects Are Reported But
Progress Continues

PHILADELPHIA, April 30—Construction in the automotive industries as reported to *Automotive Industries* this week was relatively easy after the highly satisfactory position reported last week. Airport construction seems to have taken a temporary slump with the progress of spring, and most of the projects reported this week are of a relatively small nature. Among them are:

Bloch & Hesse, New York architects, filed plans for six-story automobile service repair and garage building on West Sixty-sixth St., to cost \$150,000 with equipment.

Blevins Aircraft Corp., Atlanta, Ga., is planning extensions in shop and repair facilities at Candler Field, including installation of tools and equipment. J. H. Candler is president.

Fredericks Armature Corp., Chicago manufacturer of electrical armatures and kindred products, has leased 30,000 sq. ft. floor space in building at 1315-25 South Wabash Ave., and will remove to new location, where production will be advanced.

Stevens Roller Bearing Corp., Detroit, recently organized with capital of \$50,000 by Daniel Stevens and associates plans operation of local plant for production of roller bearings and kindred equipment for automobiles.

Winton Engine Works, Inc. (Diesel engines), Cleveland, has filed plans for a two-story addition, to cost about \$45,000 with equipment.

John Velcio, Youngstown, has acquired former plant of East Palestine Rubber Co., East Palestine, Ohio, and will remodel for new plant to manufacture electrical apparatus.

All-American Airways, Miami, Fla., is planning expansion at local airport consisting of one, two and three-story terminal, with hangar, repair shop and other mechanical divisions, to cost \$500,000 with equipment. Other field units will also be constructed. Charles P. Nieder, Calumet Bldg., is architect; J. H. Wentworth is president and general manager.

Buhl Aircraft Co. has taken over an interest in the Mamer Air Transport Co. An exchange of stock in the local firm for three six-passenger ships was made. The Mamer firm recently was awarded the contract for the Spokane-St. Paul air mail service.

Leo S. Ross, contractor, Yakima, Wash., will erect a 225-car capacity ramp garage costing \$100,000. The building, of Spanish type architecture, will be five floors and basement.

George Natwick, Coeur d'Alene, Idaho, is building brick and concrete garage and office building for the Coeur d'Alene Auto Freight line. Building will cost approximately \$20,000.

Adopts Air Conditioning

BALTIMORE, April 29—The Baltimore & Ohio Railroad announces that one of the Pullman cars running on its lines, the Martha Washington, is completely equipped to cool and cleanse the air and control the degree of humidity. If it should become the regular practice to "manufacture weather" in railroad cars, it would probably not be long before bus operators would follow the example.

Budd Ownership Widened

PHILADELPHIA, April 29—Ownership of the Edward G. Budd Manufacturing Company of Philadelphia and Detroit, is now distributed among 4422 holders of the common stock, according to an announcement by H. A. Coward, secretary. This compares with 521 common stockholders on Feb. 1, 1929, and 4177 on Feb. 1, 1930.

Ford Keeps Vacant Plant

LOUISVILLE, KY., April 29—Announcement was made in Louisville on April 24, that the Ford Motor Co., had again withdrawn its vacant Third Street assembly plant from the real estate market. In February, 1925, the company moved into a new Riverside plant, after outgrowing its original plant, erected just a few years ago. The Third Street plant has been vacant since that time, and has been on the market and off again several times.

Stromberg Motoscope Corp. Formed in Chicago

CHICAGO, April 28—Incorporation of the Stromberg Motoscope Corp., whose business is the manufacture of motor testing devices, was announced today. The incorporators are E. A. Stromberg, F. L. Wilk and Charles T. Adams.

The initial capitalization of the company will consist of 5000 shares of Class "A" participating preferred stock of a par value of \$25 per share and 30,000 shares of Class "B" common stock of no par value. The plan is to issue, shortly, the Class "A" and Class "B" stock in units of one share of "A" and one share of "B" stock at \$30 per unit. Ownership of the Motoscope Corp. of America and the Wilk-Kerr Co. are to be acquired in forming the new company.

Chamberlin Heads Crescent

NEW YORK, April 29—Col. Clarence D. Chamberlin, president, Crescent Aircraft Corp., 372 Lembeck Avenue, Jersey City, N. J., is at head of new corporation now being organized to construct and operate airport and seaplane base at Doyers Point, near factory, for service in metropolitan New York district. It will include hangars, repair and reconditioning shops, flying school, storage and distributing buildings and other field structures, entire project to cost over \$400,000 with equipment.

Massachusetts Insurance Bill Killed

BOSTON, April 28—All talk of having Massachusetts adopt a state fund for compulsory automobile insurance was dropped when the State Supreme Court in a report to the legislature said that the Goodwin bill filed with the legislature by Frank A. Goodwin, former Motor Registrar, would be unconstitutional on many points. With receipt of the decision of the Supreme Court the legislative Committee on Insurance reported against the bill.

Miller Body Suspends

QUINCY, ILL., April 28—The E. M. Miller Co., since the discontinuance of its carriage and coach building business, with which it had been identified since its establishment here in 1856, manufacturer of automobile and coach bodies, will suspend active operation May 1. J. E. Hildebrand and Leo F. Amen, associated with the company several years, have formed a partnership and are taking over its tools, machinery and usable material.

Increased Freight Rates Recommended to I.C.C.

Examiners Report Covers Iron, Steel,
By-Products, Etc.

WASHINGTON, April 29—Rates on iron and steel, by-product coke, coal and many other commodities would be increased to those proposed by the railroads of 3 cents for one-line hauls, 3.5 cents for two-line hauls and 4 cents per 100 lb., for three-or-more-line hauls, minimum carload 60,000 lb., within the Chicago switching district if the Interstate Commerce Commission approves a proposed report by Examiners Howard C. Faul and W. B. Wilbur, made public yesterday.

Rates of 4.5 cents for two-line hauls and 5 cents for three-or-more-line hauls, carload minimum 60,000 lb., were recommended for application on commodities moving between Chicago Heights, Chicago and points within the Chicago switching district. The present iron and steel rates within the Chicago switching district and between Chicago and Chicago Heights are 2 cents, 2.5 cents and 3 cents per 100 lb., respectively, on one, two and three and three-or-more-line hauls.

Caterpillar Adds Unit

PEORIA, ILL., April 28—Construction of a new assembly plant for the Caterpillar Tractor Co. here has been started to provide for increased production of combines and tractors. At present the main building is used for assembly purposes but with completion of the new \$200,000 unit, 405 ft. by 395 ft., is completed and equipped, all assembly will be transferred there. It is the second addition to the Caterpillar plant within recent months.

Crude Rubber Quiet

NEW YORK, April 28—The crude rubber market remained in an easy condition last week, on account of liquidation of foreign accounts and curtailed consumption here, according to F. R. Henderson Corp. Arrivals of crude rubber at all ports of the United States from April 1 to 25 are estimated at 39,500 tons, with probable arrivals for the month placed at 47,000 tons.

Pressed Steel Plant to Move

DETROIT, April 28—Stockholders of the United States Pressed Steel Co. of Ypsilanti, Mich., have voted to move the plant to Kalamazoo, Mich., where the company has purchased a factory from the Youngstown Sheet and Tube Co. The United States Pressed Steel Co. recently sold its plant at Ypsilanti to the Ford Motor Co. Officials of the former company have indicated that the move to Kalamazoo is expected to be completed by midsummer.

Monark Plans Philadelphia Plant

CHICAGO, April 29—Monark Battery Co. has leased 32,000 sq. ft. in a Philadelphia manufacturing plant, and will proceed with arrangements for manufacturing 2000 batteries a day.

Invitations Accepted for Safety Conference

President Hoover Holds Preliminary Session With Leaders

WASHINGTON, May 1—Governors of all the states and mayors of the principal cities and towns have accepted the invitation of President Hoover to send official delegations to the third National Conference on Street and Highway Safety to be held here May 27, 28 and 29. Announcement to this effect was made by the President on Wednesday of last week after he held a preliminary conference with representatives of associations interested in street and highway traffic problems. The President also stated that Secretary of Commerce R. P. Lamont, who attended the conference, will be chairman of the safety conference.

"We are confronted with a great and increasingly serious problem in our street and highway traffic," said President Hoover. "The accident rate has mounted steadily despite the measures adopted as the result of previous conferences. Without these efforts the situation would be worse, but the steadily increasing congestion of traffic has outrun all measures of safety."

Publishes Brake Code

WASHINGTON, April 29—A safety code for brakes and brake testing has been published by the Bureau of Standards, Washington, D. C. The code was formulated by a committee representing the various interested industries and organizations and has been approved by the American Standards Association. It is so drawn up that it may be incorporated in state laws relating to motor vehicles operated on the public highways. The code is based on experiments and tests on the braking power or stopping capacities of all types of motor vehicles, which were conducted in Washington, Philadelphia, Baltimore, New York and the vicinity of Cincinnati, Ohio, in addition to data furnished by experimenters in Massachusetts.

Illinois Announces Mileage

SPRINGFIELD, ILL., April 28—Illinois has completed 8,449.52 miles of surfaced highways, according to report of Frank T. Sheets, chief highway engineer, and H. H. Cleaveland, director of the department of public works and buildings. Of this mileage, 6,490.84 miles are in state bond issue and Federal aid systems; 259.44 state aid; 1,668.76 in county 15-D and 30.4 miles miscellaneous.

Michelin Closes Tire Plant

MILLTOWN, N. J., April 29—Closing of the Milltown plant of the Michelin Tire Co. has been announced by J. Hauvette-Michelin, who states that the date of reopening is uncertain, and that the plant improvement program recently undertaken will be continued in the interval. A skeleton organization is being retained.

Stearns Property Sold

DETROIT, April 28—Stearns Motor Mfg. Co. of Ludington, Mich., has been sold to the General Parts Corp., Detroit, for \$160,000 by order of Judge Fred M. Raymond in District Court, Grand Rapids, Mich. The Detroit firm previously had put in a high bid of \$132,000, but it was reported there had been protests. Officials of General Parts have announced that production at the Ludington plant will be continued. The Stearns Co. entered voluntary receivership some months ago on petition of creditors.

Muskegon-Jackson Merger Seen as a Possibility

DETROIT, April 28—Merger of Muskegon Motor Shaft Specialties Co., Muskegon, Mich., and the Jackson Motor Shaft Co., Jackson, Mich., is forecast in a recommendation of directors of former company to stockholders to increase capital stock from 187,500 to 500,000 shares. Muskegon company stockholders are to meet May 12 to approve such increase and to authorize directors to offer stockholders of Jackson Motor Shaft to exchange their capital stock share for share for newly authorized common stock of Muskegon Motor Specialties.

Present capitalization of the Muskegon Motor Specialties Co. consists of 62,500 shares of convertible Class A stock listed on Chicago Exchange and 125,000 shares of common outstanding. Capitalization of Jackson Motor Shaft is 100,000 shares of common stock. Muskegon company has agreed as part of consolidation plan to make application to list shares of new common on Detroit and Chicago exchanges. As a result of the projected consolidation it is contemplated that a volume of camshaft production will be concentrated at Jackson, owing to lower freight rates to Detroit.

Midland Gets Frame Orders

CLEVELAND, April 29—New orders for automobile frames aggregating nearly \$2,000,000 for the year have been received by the Midland Steel Products Co. during the past few days, it was announced yesterday by E. J. Kulas, president of the company. The orders have come from a number of leading automobile companies, including Hupmobile, LaSalle and the Studebaker Co.

Ingersoll Books Large Order

CHICAGO, April 28—R. C. Ingersoll, president of Ingersoll Steel & Disc Company, subsidiary of Borg-Warner Corp., today announced that the Galesburg works of the Ingersoll company had received a \$500,000 order for motor supports and timing gear covers from a large automobile manufacturer.

Bopp Steel Producing

DETROIT, April 28—Bopp Steel Corp. has begun production in its new plant in Dearborn. It is expected that production will run at 1000 tons of cold-rolled strip each month. A. J. Bopp is president and general manager.

Business in Brief

*Written by the Guaranty Trust
Co., New York, exclusively for
AUTOMOTIVE INDUSTRIES.*

NEW YORK, April 30—The cold weather in the eastern and northern parts of the United States last week affected retail trade adversely. Business in New England is reported to be on the upturn, and sentiment is better. Sales of one large mail-order house during the four weeks ended April 23 were 4.5 per cent below those a year ago.

RETAIL FOOD PRICES

Retail food prices on March 15, as reported to the United States Department of Labor, were 2 per cent below those a year ago.

INDUSTRIAL ACTIVITY

Industrial activity during March, based on the consumption of electrical energy in manufacturing operations, was 1.2 per cent above that in the preceding month. The average rate of activity for the first quarter of the year was 9.4 per cent below that a year ago.

LIFE INSURANCE SALES

Sales of ordinary life insurance during the first quarter of the year were 6 per cent above those in the corresponding quarter last year. This favorable report is the result of a general increase throughout the country.

COTTON SPINNING

The number of cotton spinning spindles in place at the end of March totaled 34,317,498, of which 28,898,464 spindles were operated some time during the month, as against 28,926,580 spindles a month earlier and 31,102,784 spindles a year ago.

FISHER'S INDEX

Professor Fisher's index of wholesale commodity prices for the week ended April 26 stood at 90.2 per cent, as against 90.7 per cent a week earlier and 91.3 per cent two weeks earlier.

BANK DEBITS

Bank debits to individual accounts outside of New York City for the week ended April 23 were 8 per cent below those a year ago.

BROKERS' LOANS

Brokers' loans in New York City for the week ended April 23 increased \$92,000,000, the increase for the eight weeks ended April 23 being \$728,000,000.

FEDERAL RESERVE STATEMENT

The consolidated statement of the Federal Reserve banks for the week ended April 23 showed decreases of \$45,500,000 in holdings of bills bought in the open market, of \$8,000,000 in holding of Government securities, of \$2,300,000 in holdings of discounted bills, and of \$16,800,000 in member bank reserve deposits. The reserve ratio on April 23 was 81.8 per cent, as against 80.4 per cent a week earlier and 74.3 per cent a year earlier.

Historic Exhibit Grows for French Lick Meeting

S. A. E. Announces Securing of
Important Relics

NEW YORK, April 28—Plans for the celebration of the twenty-fifth anniversary of the Society of Automotive Engineers to be held at French Lick Springs Hotel, French Lick, Ind., May 25 to 29, includes a presentation of a number of historic motor cars and accessories, displays of early newspaper and magazine automotive advertising, and a showing of photographs and editorial accounts of outstanding automotive events which have occurred in the past twenty-five years.

More than 1200 automotive engineers and executives are expected to be present including a score of prominent officials who can claim association with the motor industry since the early nineties. Among the several hundred exhibits will be contributions loaned by the Smithsonian Institution including the Manly aeronautical engine, several models of early internal combustion engines; the famous "999" racer" and other museum pieces loaned by Henry Ford.

Modine at High Level

CHICAGO, April 28—Reports of the Modine Mfg. Co. indicate that the volume of business during the first half of 1930 will probably equal that of the corresponding period last year, and that the earnings for the entire year should exceed last year's record total of \$882,223. The company's earnings increased 227 per cent in the period from 1925 to 1929.

Aero Engine Output Gains

WILLIAMSPORT, PA., April 28—April output in the airplane engine division of Lycoming Manufacturing Co. probably will show an increase of 50 per cent compared with March, W. H. Beal, vice-president, said today.

Hamilton Names Distributor

NEW YORK, April 28—Hamilton Standard Steel Propeller Corp. has appointed Air Associates, Inc., to handle distribution and service of its products at Roosevelt Field, Long Island, and Chicago Municipal Airport.

Feature Issues of Chilton Class Journal Publications

Automobile Trade Journal and Motor Age, "Make Money from Maintenance Issue," May, 1930.

Ready May 1

Chilton Automotive Multi-Guide, First Semi-annual Issue.

Ready in May

Italian Car Imports Drop

WASHINGTON, April 28—A marked decline was registered in both the Italian imports and exports of motor cars during the month of February, 1930, according to Trade Commissioner D. F. Spencer, Milan, in a report to the Department of Commerce. Unfavorable conditions existing throughout the world which were caused by the Wall Street reversals are credited with having caused this decrease in trade.

Imports of automobiles for the month of January were 366 as compared with 509 for January, 1929. This represents a decrease of 24 per cent. Exports for January were 1348 as compared with 1937 for the month of January, 1929, a decrease of 30 per cent.

Briggs and Stratton to Add

MILWAUKEE, WIS., April 28—The Briggs and Stratton Corporation will add another floor to its five-story plant here at a cost of approximately \$60,000. The addition will provide 15,000 sq. ft. of floor space which will be available for the company's motor division, the expansion being necessitated by orders calling for increased production in that department.

Borg Service Unit Gains

CHICAGO, April 28—Sales of the Borg-Warner Service Parts Company, a subsidiary of the Borg-Warner Corporation, in each of the first three months of 1930 showed an increase over the preceding month, according to C. S. Davis, president of the parent company.

Motor Wheel Earnings Decline for Quarter

Figure is 75 Cents a Share Against
\$1.60 Last Year

CHICAGO, April 29—Motor Wheel Corp., for the quarter ended March 31, 1930, reports a net income of \$594,438, after all charges and Federal taxes, equal to 75 cents a share on 825,000 common shares as compared with net profit of \$1,101,803 or \$1.60 a share in the same quarter a year ago.

Operating income for the March quarter amounted to \$841,684 as compared with \$1,099,808 in the corresponding period in 1929. Surplus at the end of March quarter stood at \$6,666,728 as compared with \$6,682,189 at the beginning of the quarter. The balance sheet as of March 31, 1930, shows total assets of \$16,523,429 as compared with \$16,193,202 at the end of 1929. Current assets totaled \$8,281,845 and current liabilities were \$1,260,718. As of Dec. 31, 1929, current assets were \$7,774,771 and current liabilities were \$1,090,916.

Auburn Shipments Increase

AUBURN, IND., April 28—April shipments of Auburn Automobile Co. are running about 10 per cent ahead of the March shipments, R. H. Faulkner, vice-president, said today. Schedules were set at 2700 Auburn and Cord cars for the month, compared with production of 2500 for March. The March production was 12.6 per cent ahead of March, 1929.

Wabash May Operate Buses

DECATUR, ILL., April 28—Entrance of the Wabash Railway Company in the motor bus field was foreseen this week with letters of inquiry to cities and commercial organizations along its main line between Decatur and East St. Louis relative to establishment of such service.

International Opens Branch

SIOUX CITY, IOWA, April 28—One of the largest service rooms maintained by the International Harvester Co. is located in its new Sioux City branch just opened at Dave Avenue and Virginia Street.

Calendar of Coming Events

SHOWS

Berlin, International Automobile...Nov. 6-16

CONVENTIONS

National Council Meeting of the U. S. Chamber of Commerce, Washington...April 28
U. S. Chamber of Commerce Annual Meeting, Washington...April 28-May 1
American Gear Manufacturers Association, Annual Meeting, Cincinnati...May 1-3
Associated Business Papers-Spring Meeting, White Sulphur Springs, Va.May 5-6-7
National Association of Credit Men, Annual Convention, Dallas...May 12-16
National Aeronautic Meeting (Auspices A.S.M.E.), Dayton, Ohio...May 19-22
National Foreign Trade Conference, Los Angeles...May 21-23
Society of Automotive Engineers, Summer Meeting, French Lick Springs...May 25-29

Automotive Engine Rebuilders' Association, Convention, Chicago...May 26-28
National Conference on Street and Highway Safety, Washington...May 27-29
National Automobile Chamber of Commerce, Annual Meeting, New York...June 5
A. S. M. E., Semi-Annual Meeting, Detroit...June 9-12
A. S. M. E., Oil, Power & Gas Div. State College, Pa.June 12-14
World Power Conference, Berlin...June 16-25
Railway Supply Mfrs. Assn., Meeting and Exhibit, Atlantic City...June 18-25
American Railway Association, San Francisco...June 23-26
American Society for Testing Materials, Annual Meeting, Atlantic City...June 23-27
Steel Founders Soc. (Midsummer Convention) White Sulphur Springs...June 26-28

Eastern States Exposition, Springfield, Mass.Sept. 14-20
National Safety Council, Annual Safety Congress, Pittsburgh...Sept. 29-Oct. 4
Sixth International Road Congress, Washington, D. C.Oct. 6-11
Exhibition-American Roadbuilders Association, Washington, D. C....Oct. 6-11
Motor and Equipment Association, Convention, Cleveland...Nov. 10-14

SALONS

Chicago, Drake Hotel...Nov. 8-15
New York, Commodore Hotel...Nov. 30-Dec. 6

RACES

Indianapolis...May 30
Belgium...July 5-6
Germany (Grand Prix)...July 13
Belgium (European Grand Prix)...July 20
Spain...July 27
Italy (Grand Prix)...Sept. 7
France (Grand Prix)...Sept. 21